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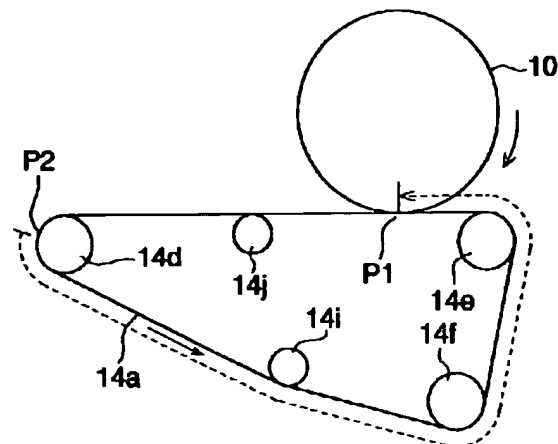
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(54) 【発明の名称】 画像形成装置

(57) 【要約】

【課題】 予備回転のみでは解消されない停止時のベルト状の中間転写体の曲がり癖を矯正して、中間転写体の曲がり癖により発生するトナー像の転写抜けや中間転写体の回転むらによるトナー像の乱れや転写不良を防止する画像形成装置を提供すること。

【解決手段】 停止時の中間転写体位置がローラ部材当接位置である部分を、プリント状態までに、像担持体当接位置に維持することを特徴とする画像形成装置。



## 【特許請求の範囲】

【請求項1】 像担持体により形成されたトナー像を、複数本のローラ部材により張架されるベルト状の中間転写体を介して転写材の両面に転写する画像形成装置において、

停止時の中間転写体位置がローラ部材当接位置である部分を、プリント状態までに、像担持体当接位置に維持することを特徴とする画像形成装置。

【請求項2】 像担持体により形成されたトナー像を、複数本のローラ部材により張架されるベルト状の中間転写体を介して転写材の両面に転写する画像形成装置において、

停止時の中間転写体位置が像担持体当接位置である部分を、プリント状態までに、ローラ部材当接位置に維持することを特徴とする画像形成装置。

【請求項3】 前記停止時の中間転写体位置がローラ部材当接位置である部分を、プリント状態までに、前記像担持体当接位置に維持することと、前記停止時の中間転写体位置が像担持体当接位置である部分を、プリント状態までに、前記ローラ部材当接位置に維持することとを繰返すことを特徴とする請求項1または2に記載の画像形成装置。

【請求項4】 像担持体により形成されたトナー像を、複数本のローラ部材により張架されるベルト状の中間転写体を介して転写材の両面に転写する画像形成装置において、

待ち状態では、ローラ部材当接位置を間欠的に変更することを特徴とする画像形成装置。

【請求項5】 像担持体により形成されたトナー像を、複数本のローラ部材により張架されるベルト状の中間転写体を介して転写材の両面に転写する画像形成装置において、

待ち状態では、像担持体当接位置を間欠的に変更することを特徴とする画像形成装置。

【請求項6】 像担持体により形成されたトナー像を、複数本のローラ部材により張架されるベルト状の中間転写体を介して転写材の両面に転写する画像形成装置において、

前記中間転写体の両端部にベルト寄り止め部材を設けると共に、前記ベルト寄り止め部材を受けるローラ部材角部に曲面を設け、

前記ベルト寄り止め部材の厚さを $t$  (mm)、前記ローラ部材角部の曲面の半径を $r$  (mm)とすると、

$$t/5 \leq r \leq t/3$$

とすることを特徴とする画像形成装置。

【請求項7】 前記ベルト寄り止め部材の厚さを、 $0.8 \sim 1.5$  mmとすることを特徴とする請求項6に記載の画像形成装置。

【請求項8】 像担持体により形成されたトナー像を、複数本のローラ部材により張架されるベルト状の中間転

写体を介して転写材の両面に転写する画像形成装置において、

前記中間転写体の両端部にベルト寄り止め部材を設けると共に、前記ローラ部材の両側端に前記ベルト寄り止め部材を受ける回動部材を設け、

前記回動部材と前記ローラ部材の側面との接触面の最大径を $R1$  (mm)、前記ローラ部材の前記中間転写体の張架部の最大径を $R2$  (mm)とすると、

$$(R1/R2) < 1/2$$

とすることを特徴とする画像形成装置。

【請求項9】 像担持体により形成されたトナー像を、複数本のローラ部材により張架されるベルト状の中間転写体を介して転写材の両面に転写する画像形成装置において、

前記中間転写体の両端部にベルト寄り止め部材を設けると共に、

前記ローラ部材の少なくとも何れか1つの両端部に、前記中間転写体を挟み前記ベルト寄り止め部材と対向して前記中間転写体の端部をガイドするガイド部材を設けることを特徴とする画像形成装置。

【請求項10】 前記像担持体にトナー像を形成するトナー像形成手段と接する前記中間転写体の平面に沿って前記ガイド部材を設けることを特徴とする請求項9に記載の画像形成装置。

【請求項11】 像担持体により形成されたトナー像を、複数本のローラ部材により張架されるベルト状の中間転写体を介して転写材の両面に転写する画像形成装置において、

前記中間転写体の両端部にベルト寄り止め部材を設けると共に、

前記ローラ部材の少なくとも何れか1つの両端部に、前記ベルト寄り止め部材と対向して前記中間転写体の端部表面を押圧する押圧部材を設けることを特徴とする画像形成装置。

【請求項12】 前記像担持体にトナー像を形成するトナー像形成手段と接する前記中間転写体の平面に沿って前記押圧部材を設けることを特徴とする請求項11に記載の画像形成装置。

## 【発明の詳細な説明】

## 【0001】

【発明の属する技術分野】本発明は、像担持体に形成したトナー像を転写材上に転写する複写機、プリンタ、FAX等の画像形成装置に関し、特に転写材の両面に画像を形成することができる画像形成装置、例えば、像担持体の周辺に帯電手段と画像書込手段と現像手段とを配置して転写材の両面に画像を形成することができる電子写真方式の画像形成装置に関する。

## 【0002】

【従来の技術】従来、両面画像形成においては、像担持体上に形成した一方の面の画像を転写材上に転写、定着

し、これを一旦両面反転給送装置に収納し、再び像担持体上に形成された画像とタイミングを合わせて両面反転給送装置より転写材を給送し、転写材上に他方の面の画像を転写、定着する方法がとられている。

【0003】この両面画像形成装置では、上記の如く、両面反転給送装置への給送や定着装置を2度通す等の転写材の搬送が行われるので、転写材搬送の信頼性が低く、転写材のジャムやしわ等を引き起こす原因となっている。

【0004】これに対し、特公昭49-37538号公報、同54-28740号公報、特開平1-44457号公報や同4-214576号公報等により、像担持体と中間転写体とを用いて転写材の両面にトナー像を形成後、1回で定着を行うものが提案されている。

【0005】また、本願発明者らは、感光体ドラム（像担持体）の周りに帯電手段、画像書込手段、現像手段等よりなるトナー像形成手段を複数組配置し、感光体ドラム上に形成した重ね合わせカラートナー像を一旦複数のローラ部材に張架されるベルト状の中間転写体に一括して転写した後、再度感光体ドラム上に重ね合わせカラートナー像を形成し、感光体ドラム上のトナー像及び中間転写体上のトナー像とタイミングを合わせて給送され、中間転写体により搬送される転写材の両面にそれぞれ、感光体ドラム上のトナー像を表面画像として転写し、また中間転写体上のトナー像を裏面画像として転写した後、中間転写体から転写材を分離し、転写材上のトナー像を定着して両面カラー画像を形成する画像形成装置や画像形成方法を特開平9-258492号公報や特開平9-258516号公報にて開示した。

【0006】

【発明が解決しようとする課題】しかしながら、上記の画像形成装置において、ベルト状の中間転写体を非画像形成時（停止時）に回転せずに放置しておくと、画像形成時に中間転写体の予備回転を行っても、予備回転のみでは解消されない中間転写体にベルトの曲がり癖が生じ、ベルト状の中間転写体の曲がり癖により転写時のトナー像の転写抜けや中間転写体の回転むらによるトナー像の乱れや転写不良が発生するという問題が起こる。

【0007】本発明は上記の問題点を解決し、予備回転のみでは解消されない停止時のベルト状の中間転写体の曲がり癖を矯正して、中間転写体の曲がり癖により発生するトナー像の転写抜けや中間転写体の回転むらによるトナー像の乱れや転写不良を防止する画像形成装置を提供することを第1の目的とする。

【0008】また電源オン後でもプリント迄の時間が長いと、中間転写体にベルトの曲がり癖が生じ、ベルト状の中間転写体の曲がり癖により転写時のトナー像の転写抜けや中間転写体の回転むらによるトナー像の乱れや転写不良が発生するという問題が起こる。

【0009】本発明は上記の問題点を解決し、電源オン

でもプリント迄の待ち状態時間が長い場合に生じるベルト状の中間転写体の曲がり癖を矯正して、中間転写体の曲がり癖により発生するトナー像の転写抜けや中間転写体の回転むらによるトナー像の乱れや転写不良を防止する画像形成装置を提供することを第2の目的とする。

【0010】また上記の画像形成装置において、本願発明者らはベルト状の中間転写体の両端部に、ローラ部材端部に係合するベルト寄り止め部材を設けてベルト状の中間転写体の寄りを防止するよう検討しているが、中間転写体の長期の使用によりベルト寄り止め部材がローラ部材と擦られて削られ、削れかすがベルト状の中間転写体裏面に付着してローラ部材の間に挟まれ、中間転写体に凹凸が形成されてしまい、転写時に転写不良が生じたり、削れによる中間転写体の寿命の低下が生じるという問題が起こる。

【0011】本発明は上記の問題点を解決し、ベルト寄り止め部材によりベルト状の中間転写体の寄りを防止すると共に、ベルト寄り止め部材の削れを防止し、削れかすがベルト状の中間転写体裏面に付着してローラ部材の間に挟まれ、中間転写体に凹凸が形成されてしまうことにより発生する転写不良や削れによる中間転写体の寿命の低下を防止する画像形成装置を提供することを第3の目的とする。

【0012】また同様に上記の画像形成装置において、本願発明者らはベルト状の中間転写体の両端部に、ローラ部材端部に係合するベルト寄り止め部材を設けてベルト状の中間転写体の寄りを防止するよう検討しているが、ベルト状の中間転写体がローラ部材側に寄ってくると、中間転写体がローラ部材端部上面に乗り上げては落下し、中間転写体とローラ部材との間でバンという落下音が起こる。この中間転写体の乗り上げ・落下の際に、中間転写体の駆動むら生じ、中間転写体の駆動むらによる中間転写体上のトナー像の乱れや転写時の転写不良が発生するという問題が起こる。

【0013】本発明は上記の問題点を解決し、ベルト寄り止め部材によりベルト状の中間転写体の寄りを防止すると共に、ベルト寄り止め部材のローラ部材への乗り上げ・落下を防止し、乗り上げ・落下時の中間転写体の駆動むらにより発生する中間転写体上のトナー像の乱れや転写時の転写不良を防止する画像形成装置を提供することを第4の目的とする。

【0014】

【課題を解決するための手段】上記第1の目的は、像担持体により形成されたトナー像を、複数本のローラ部材により張架されるベルト状の中間転写体を介して転写材の両面に転写する画像形成装置において、停止時の中間転写体位置がローラ部材当接位置である部分を、プリント状態までに、像担持体当接位置に維持することを特徴とする画像形成装置（第1の発明）。及び、像担持体により形成されたトナー像を、複数本のローラ部材により

張架されるベルト状の中間転写体を介して転写材の両面に転写する画像形成装置において、停止時の中間転写体位置が像担持体当接位置である部分を、プリント状態までに、ローラ部材当接位置に維持することを特徴とする画像形成装置（第2の発明）によって達成される。

【0015】また、上記第2の目的は、像担持体により形成されたトナー像を、複数本のローラ部材により張架されるベルト状の中間転写体を介して転写材の両面に転写する画像形成装置において、待ち状態では、ローラ部材当接位置を間欠的に変更することを特徴とする画像形成装置（第3の発明）。及び、像担持体により形成されたトナー像を、複数本のローラ部材により張架されるベルト状の中間転写体を介して転写材の両面に転写する画像形成装置において、待ち状態では、像担持体当接位置を間欠的に変更することを特徴とする画像形成装置（第4の発明）によって達成される。

【0016】また、上記第3の目的は、像担持体により形成されたトナー像を、複数本のローラ部材により張架されるベルト状の中間転写体を介して転写材の両面に転写する画像形成装置において、前記中間転写体の両端部にベルト寄り止め部材を設けると共に、前記ベルト寄り止め部材を受けるローラ部材角部に曲面を設け、前記ベルト寄り止め部材の厚さを $t$  (mm)、前記ローラ部材角部の曲面の半径を $r$  (mm) とするとき、 $t/5 \leq r \leq t/3$  とすることを特徴とする画像形成装置（第5の発明）。及び、像担持体により形成されたトナー像を、複数本のローラ部材により張架されるベルト状の中間転写体を介して転写材の両面に転写する画像形成装置において、前記中間転写体の両端部にベルト寄り止め部材を設けると共に、前記ローラ部材の両側端に前記ベルト寄り止め部材を受ける回転部材を設け、前記回転部材と前記ローラ部材の側面との接触面の最大径を $R1$  (mm)、前記ローラ部材の前記中間転写体の張架部の最大径を $R2$  (mm) とするとき、 $(R1/R2) < 1/2$  とすることを特徴とする画像形成装置（第6の発明）によって達成される。

【0017】また、上記第4の目的は、像担持体により形成されたトナー像を、複数本のローラ部材により張架されるベルト状の中間転写体を介して転写材の両面に転写する画像形成装置において、前記中間転写体の両端部にベルト寄り止め部材を設けると共に、前記ローラ部材の少なくとも何れか1つの両端部に、前記中間転写体の端部をガイドするガイド部材を設けることを特徴とする画像形成装置（第7の発明）。及び、像担持体により形成されたトナー像を、複数本のローラ部材により張架されるベルト状の中間転写体を介して転写材の両面に転写する画像形成装置において、前記中間転写体の両端部にベルト寄り止め部材を設けると共に、前記ローラ部材の少なくとも何れか1つの両端部に、前記ベルト寄り止

め部材と対向して前記中間転写体の端部表面を押圧する押圧部材を設けることを特徴とする画像形成装置（第8の発明）によって達成される。

【0018】

【発明の実施の形態】以下、本発明の実施の形態を説明する。なお、本欄の記載は請求項の技術的範囲や用語の意義を限定するものではない。また、以下の、本発明の実施の形態における断定的な説明は、ベストモードを示すものであって、本発明の用語の意義や技術的範囲を限定するものではない。なお以下の実施形態の説明において、転写域において像担持体に対向する側の転写材の面を表面、転写材の他方の面すなわち中間転写体に対向する側の転写材の面を裏面といい、転写材の表面に転写される画像を表面画像、転写材の裏面に転写される画像を裏面画像という。

【0019】本発明の各請求項に共通する画像形成装置の一実施形態の画像形成プロセス、各機構について、図1ないし図3を用いて説明する。図1は、本発明の各請求項に共通する画像形成装置の一実施形態を示すカラー画像形成装置の断面構成図であり、図2は、図1の像担持体の側断面図であり、図3は、本発明の各請求項に共通する画像形成装置におけるトナー像形成状態を示す図であり、図3(A)は、像担持体に形成した裏面画像を中間転写体上に転写するときのトナー像形成状態を示す図であり、図3(B)は、中間転写体上の裏面画像と同期して像担持体に表面画像を形成するときのトナー像形成状態を示す図である。

【0020】図1において、10は像担持体である感光体ドラム、11は各色毎の帯電手段であるスコロトロン帯電器、12は各色毎の画像書込手段である露光光学系、13は各色毎の現像手段である現像器、14aは中間転写体である中間転写ベルト、14cは像担持体上のトナー像を中間転写体に転写する手段および像担持体上のトナー像を転写材の表面に転写する手段である転写器、14gは中間転写体上のトナー像を転写材の裏面に転写する手段である裏面転写器、14mは除電手段である除電器、150は転写材帯電手段である紙帯電器、14hは転写材分離手段である紙分離AC除電器、160は爪部材である分離爪210と拍車部材である拍車162とを有する搬送部、17は定着手段である定着装置である。

【0021】像担持体である感光体ドラム10は、例えば、光学ガラスや透明アクリル樹脂等の透明部材によって形成される円筒状の基体の外周に、透明の導電層、a-Si層あるいは有機感光層(OPC)等の感光層を形成したものであり、導電層を接地した状態で図1の矢印で示す時計方向に、例えば80~400mm/secの線速度にて回転される。

【0022】感光体ドラム10は、図2に示すように、それを係合固定する両端部のフランジ部材10A及び1

0Bに嵌込まれたベアリングB1、B2により、装置本体に架設固定されるドラム軸30に対し軸受けされて回転自在に支持され、フランジ部材10Bの一体とする歯車Gが装置本体側の不図示の駆動歯車と噛合して駆動されることにより所定の方向に定速で回転される。

【0023】像担持体上にトナー像を形成する手段は、帯電手段であるスコトロロン帯電器11、画像書込手段である露光光学系12及び現像手段である現像器13からなり、これらを1組として、イエロー(Y)、マゼンタ(M)、シアン(C)および黒色(K)の各色の画像形成プロセス用として4組設けられ、図1の矢印にて示す感光体ドラム10の回転方向に対して、Y、M、C、Kの順に配置される。

【0024】各色毎の帯電手段であるスコトロロン帯電器11は、それぞれ所定の電位に保持された制御グリッドと例えば鋸歯状電極からなる放電電極11aとを有し、感光体ドラム10の感光層と対峙して取付けられ、トナーと同極性のコロナ放電によって帯電作用(本実施形態においてはマイナス帯電)を行い、感光体ドラム10に対し一様な電位を与える。放電電極11aとして、その他ワイヤ電極や針状電極を用いることも可能である。

【0025】各色毎の画像書込手段である露光光学系12は、感光体ドラム10上での露光位置が、前述した各色毎のスコトロロン帯電器11に対して感光体ドラム10の回転方向下流側に位置するようにして感光体ドラム10の内部に配置される。図2に示すように、それぞれの露光光学系12は、ドラム軸30と平行に主走査方向に配列された像露光光(画像書込光)の発光素子としてのLED(発光ダイオード)を複数個アレイ状に並べた線状の露光素子12aと、結像素子としての光集束性光伝送体(商品名:セルフォックレンズアレイ)12bと、レンズホルダ12cとで構成される露光用ユニットであり、保持部材20に取付けられる。保持部材20には各色毎の露光光学系12の他に転写同時露光器12d及び一様露光器12eが取付けられ、一体となって感光体ドラム10の透光性の基体内部に收容される。各色毎の露光光学系12は、別体の画像読取装置によって読み取られメモリに記憶された各色の画像データに従って感光体ドラム10の感光層を裏面から画像書込し、感光体ドラム10上に静電潜像を形成する。露光素子12aとしては、LEDの他、FL(蛍光体発光)、EL(エレクトロルミネッセンス)、PL(プラズマ放電)等の複数の発光素子をアレイ状に並べたものを用いることも可能である。像露光光(画像書込光)の発光素子の発光波長は、通常Y、M、Cのトナーに対して透過性の高い780~900nmの範囲のものが用いられるが、本実施形態においては裏面から画像書込を行う方式であるため、カラートナーに対して透過性を十分に有しないこれより短い400~780nmの波長でもよい。また、像

露光光の80%以上は感光体ドラム10の感光層で吸収されることから、感光体ドラム10表面のカラートナーによる反射や吸収の影響は無視することができる。一般にカラートナーの現像順はトナー像や現像器13への混色の関係からY、M、C、Kの順が好ましい。なお図2において、WAは像露光光の発光素子(LED)よりのリード線である。

【0026】各色毎の現像手段である現像器13は、感光体ドラム10の周面に対し所定の間隙を保ち、感光体ドラム10の回転方向と順方向に回転する例えば厚み0.5~1mm、外径15~25mmの円筒状の非磁性のステンレスあるいはアルミ材で形成された現像スリーブ131と、現像ケーシング138とを有し、現像ケーシング138の内部には、各々イエロー(Y)、マゼンタ(M)、シアン(C)および黒色(K)の一成分あるいは二成分現像剤を收容している。それぞれの現像器13は不図示の突き当てコロにより感光体ドラム10と所定の間隙、例えば100~500μmをあけて非接触に保たれており、現像スリーブ131に対して直流電圧と交流電圧を重ねた現像バイアスを印加することにより、非接触の反転現像を行い、感光体ドラム10上にトナー像を形成する。

【0027】中間転写体である中間転写ベルト14aは体積抵抗率が $10^8 \sim 10^{16} \Omega \cdot \text{cm}$ 、好ましくは $10^9 \sim 10^{12} \Omega \cdot \text{cm}$ の無端ベルトであり、例えば変性ポリイミド、熱硬化ポリイミド、エチレンテトラフルオロエチレン共重合体、ポリフッ化ビニリデン、ナイロンアロイ等のエンジニアリングプラスチックに導電材料を分散した厚さ0.1~1.0mmの半導電性フィルム基体の外側に、好ましくはトナーフィルミング防止層として厚さ5~50μmのフッ素コーティングを行った2層構成のシームレスベルトである。中間転写ベルト14aの基体としては、この他に、シリコンゴム或いはウレタンゴム等に導電材料を分散した厚さ0.5~2.0mmの半導電性ゴムベルトを使用することもできる。中間転写ベルト14aは、それぞれローラ部材である駆動ローラ14dとアスローラ14jと従動ローラ14eとガイドローラ14fとテンションローラ14iとに張架され、図1の矢印で示す反時計方向に回転される。ガイドローラ14f、従動ローラ14e、アスローラ14j及び駆動ローラ14dは固定して回転され、テンションローラ14iは不図示のバネ等の弾力により移動可能に支持されて回転される。不図示の駆動モータよりの駆動をうけて駆動ローラ14dが回転され、中間転写ベルト14aを駆動して回転させる。中間転写ベルト14aの回転によりアスローラ14j、従動ローラ14e、ガイドローラ14f及びテンションローラ14iが従動して回転される。回転中の中間転写ベルト14aのベルト弛みがテンションローラ14iにより緊張される。中間転写ベルト14aが従動ローラ14eに張架される位置に転

写材である記録紙Pが供給され、中間転写ベルト14aによって搬送される。駆動ローラ14dに張架される中間転写ベルト14aの定着装置17側の端部の曲率部KTにおいて中間転写ベルト14aから記録紙Pが分離される。

【0028】像担持体上のトナー像を中間転写体に転写する手段および像担持体上のトナー像を転写材の表面に転写する手段としての転写器14cは、中間転写ベルト14aを挟んで感光体ドラム10に対向して設けられるコロナ放電器であり、中間転写ベルト14aと感光体ドラム10との間に転写域14bを形成する。転写器14cにはトナーと反対極性（本実施形態においてはプラス極性）の直流電圧が印加され、感光体ドラム10上のトナー像を中間転写ベルト14a上または転写材である記録紙Pの表面に転写する。

【0029】中間転写体上のトナー像を転写材の裏面に転写する手段である裏面転写器14gは好ましくはコロナ放電器により構成され、中間転写ベルト14aを挟んで転写器14cと駆動ローラ14dとの間に設けられるアースローラ14jに対向して設けられ、トナーと反対極性（本実施形態においてはプラス極性）の直流電圧が印加され、中間転写ベルト14a上のトナー像を記録紙Pの裏面に転写する。

【0030】除電手段である除電器14mはコロナ放電器により構成され、中間転写ベルト14aの移動方向に対し、転写器14cの下流側に、転写器14cと並列して設けられ、交流電圧が印加され、転写器14cの電圧印加により荷電される中間転写ベルト14aの電荷を除電する。

【0031】転写材帯電手段である紙帯電器150は好ましくは鋸歯状電極により構成され、中間転写ベルト14aを挟んで接地された従動ローラ14eと対向して設けられ、トナーと同極性（本実施形態においてはマイナス極性）の直流電圧が印加され、記録紙Pを帯電して中間転写ベルト14aに吸着させる。紙帯電器150としては鋸歯状電極の他に、コロナ放電器や中間転写ベルト14aに当接および当接解除可能な紙帯電ブラシや紙帯電ローラ等を用いることも可能である。

【0032】転写材分離手段である紙分離AC除電器14hは好ましくはコロナ放電器により構成され、中間転写ベルト14aの定着装置17側端部に中間転写ベルト14aを挟んで接地された駆動ローラ14dに対向して設けられ、後述するように、裏面転写器14gに印加する直流電圧と同極性（本実施形態においてはプラス極性）の直流電圧を重畳した交流電圧が印加され、中間転写ベルト14aにより搬送される記録紙Pを除電して中間転写ベルト14aから分離する。

【0033】搬送部160は爪部材である分離爪210と拍車部材である拍車162とを有し、中間転写ベルト14aの定着装置17側の端部の曲率部KTと定着装置

17との間に設けられる。搬送部160は、定着装置17からの熱により、中間転写ベルト14aが変形したり、中間転写ベルト14aに担持されるトナー像が融着気味になって転写しにくくなったり、中間転写ベルト14a上にトナーが固着したりすることを防止する。

【0034】爪部材である分離爪210は中間転写ベルト14aの曲率部KTに近接し、中間転写ベルト14aと所定の間隔、好ましくは0.1～2.0mmを空けて支持軸221に固定されて設けられ、記録紙Pが中間転写ベルト14aより分離される際に、中間転写ベルト14a方向へ曲がって搬送されようとする記録紙Pの先端部を当接させ、記録紙Pの分離を補助する。

【0035】拍車部材である拍車162は、周面に複数の突起部162aを有し、回転支持軸165を中心として回転自在に設けられる。拍車162は、記録紙Pの裏面側をガイドして記録紙Pを搬送し、両面にトナー像を有する記録紙Pの裏面トナー像の乱れを防止するとともに、記録紙Pの定着装置17への進入方向を一定にしながら記録紙Pを安定して定着装置17へと搬送する。

【0036】分離爪210と拍車162とは、中間転写ベルト14a上の転写材搬送面或いはその延長面に対し、感光体ドラム10の反対側に配設される。転写材搬送面或いはその延長面の両側に拍車部材である拍車162を設けることも可能である。

【0037】定着手段である定着装置17は、内部にヒータを有する第1定着ローラ17aと第2定着ローラ17bとの2本のローラ状の定着部材で構成され、第1定着ローラ17aと第2定着ローラ17bとの間のニップ部Tで記録紙Pを挟持搬送し、熱と圧力とをくわえることにより、ニップ部Tを搬送される記録紙P上のトナー像を定着する。

【0038】次に画像形成プロセスを説明する。

【0039】画像記録のスタートにより不図示の感光体駆動モータの始動により感光体ドラム10が図1の矢印で示す時計方向へ回転され、同時にイエロー（Y）のスコトロシム帯電器11の帯電作用により感光体ドラム10に電位の付与が開始される。

【0040】感光体ドラム10は電位を付与されたあと、Yの露光光学系12によって第1の色信号すなわちYの画像データに対応する電気信号による画像書込が開始され、感光体ドラム10の表面に原稿画像のYの画像に対応する静電潜像が形成される。

【0041】前記の潜像はYの現像器13により非接触の状態で反転現像され、感光体ドラム10上にイエロー（Y）のトナー像が形成される。

【0042】次いで感光体ドラム10は、Yのトナー像の上からマゼンタ（M）のスコトロシム帯電器11の帯電作用により電位が付与され、Mの露光光学系12によって第2の色信号すなわちMの画像データに対応する電気信号による画像書込が行われ、Mの現像器13による

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非接触の反転現像によって前記のイエロー（Y）のトナー像の上にマゼンタ（M）のトナー像が重ね合わせて形成される。

【0043】同様のプロセスにより、シアン（C）のスコロトン帯電器11、Cの露光光学系12およびCの現像器13によってさらに第3の色信号に対応するシアン（C）のトナー像が重ね合わせて形成され、更にその上に黒色（K）のスコロトン帯電器11、Kの露光光学系12およびKの現像器13によって第4の色信号に対応する黒色（K）のトナー像が順次重ね合わせて形成され、感光体ドラム10の一回転以内にその周面上にイエロー（Y）、マゼンタ（M）、シアン（C）および黒色（K）の4色の重ね合わせカラートナー像が形成される。

【0044】これらY、M、C及びKの露光光学系12による感光体ドラム10の感光層に対する画像書込はドラムの内部より前述した透光性の基体を通して行われる。従って第2、第3および第4の色信号に対応する画像の書込は何れも先に形成されたトナー像の影響を全く受けることなく行われ、第1の色信号に対応する画像と同等の静電潜像を形成することが可能となる。

【0045】上記の画像形成プロセスによって像担持体である感光体ドラム10上に形成された裏面画像となる重ね合わせカラートナー像は、転写域14bにおいて、転写器14cによって、中間転写体である中間転写ベルト14a上に一括して転写される（図3（A））。この際、良好な転写がなされるように、感光体ドラム10の内部に設けた転写同時露光器12dによる一様露光が行われるようにしてもよい。また転写器14cにより荷電された中間転写ベルト14aの電荷は除電器14mにより除電される。

【0046】転写後の感光体ドラム10の周面上に残ったトナーは感光体ドラムAC除電器16により除電を受けた後、像担持体クリーニング手段であるクリーニング装置19にいたり、感光体ドラム10に当接したゴム材から成るクリーニングブレード19aによってクリーニングされ、スクリュウ19bによって不図示の排トナー容器に回収される。また、感光体ドラム10の周面は、例えば発光ダイオードを用いた帯電前の一様露光器12eによる露光によって先の画像形成における感光体ドラム10の履歴が解消される。

【0047】以上のようにして中間転写ベルト14a上に裏面画像となる重ね合わせカラートナー像が形成された後、感光体ドラム10上には上記のカラー画像形成プロセスと同様にして、引続き表面画像となる重ね合わせカラートナー像が形成される（図3（B））。この際、感光体ドラム10上に形成される表面画像は、前記感光体ドラム10上に形成した裏面画像に対して鏡像となるように画像データが変更される。

【0048】感光体ドラム10上への表面画像形成にと

もなって転写材である記録紙Pが転写材収納手段である給紙カセット15より、送り出しローラ15aにより送り出され、転写材給送手段としてのタイミングローラ15bへ搬送され、タイミングローラ15bの駆動によって、感光体ドラム10上に形成される表面画像のカラートナー像と、中間転写ベルト14aに担持されている裏面画像のカラートナー像との同期がとられて転写域14bへ給送される。この際、給送される記録紙Pは、記録紙Pの表面側に設けられる転写材帯電手段である紙帯電器150によりトナーと同極性に帯電され、中間転写ベルト14aに吸着されて転写域14bへ搬送される。トナーと同極性に紙帯電を行うことにより、中間転写ベルト14a上のトナー像や感光体ドラム10上のトナー像と引き合うことを防止して、トナー像の乱れを防止している。

【0049】転写域14bではトナーと反対極性（本実施形態においてはプラス極性）の電圧が印加される転写器14cによって感光体ドラム10上の表面画像が一括して記録紙Pの表面に転写される。このとき、中間転写ベルト14a上の裏面画像は記録紙Pに転写されないで中間転写ベルト14a上に存在する。この際、良好な転写がなされるように、転写域14bと対向して感光体ドラム10の内部に設けられた、例えば発光ダイオードを用いた転写同時露光器12dによる一様露光が行われるようにしてもよい。また転写器14cにより荷電された中間転写ベルト14aの電荷は除電器14mにより除電される。

【0050】表面にカラートナー像が転写された記録紙Pは、トナーと反対極性（本実施形態においてはプラス極性）の電圧が印加される裏面転写器14gへと搬送され、裏面転写器14gにより中間転写ベルト14aの周面上の裏面画像が一括して記録紙Pの裏面に転写される（図3（C））。

【0051】両面にカラートナー像が形成された記録紙Pは、中間転写ベルト14aの曲率部KTの曲率と、中間転写ベルト14aの端部に設けられる転写材分離手段としての紙分離AC除電器14hによる除電作用と、中間転写ベルト14aと所定の間隔を空けて搬送部160に設けられる分離爪210とにより、中間転写ベルト14aから分離され、搬送部160に設けられた拍車162を通して定着手段としての定着装置17へと搬送され、第1定着ローラ17aと第2定着ローラ17bとの間のニップ部T間を搬送され、ニップ部Tで熱と圧力とをくわえられることにより記録紙P上のトナー像が定着される。両面画像記録がなされた記録紙Pは表裏を反転されて送られ、排紙ローラ18により装置外部のトレイへ排出される。

【0052】転写後の中間転写ベルト14aの周面上に残ったトナーは、中間転写ベルト14aを挟んでガイドローラ14fに対向して設けられ、支軸252を回転支

点として中間転写ベルト14aに当接及び当接解除可能な中間転写体クリーニングブレード251を有する中間転写体クリーニング手段である中間転写体クリーニング装置250によりクリーニングされる。

【0053】また、転写後の感光体ドラム10の周面上に残ったトナーは、感光体ドラムAC除電器16により除電を受けた後、クリーニング装置19によりクリーニングされ、帯電前の様露光器12eにより先の画像形成における感光体ドラム10の履歴が解消されて、次の画像形成サイクルにはいる。

【0054】上記の方法を用いることにより、重ね合わせカラートナー像を一括転写するので、中間転写ベルト14a上のカラー画像の色ズレやトナーの散りやこすれ等が起こりにくく、画像劣化が少ない良好な両面カラー画像形成がなされる。

#### 【0055】実施形態1

上記の図1にて説明した画像形成装置において、中間転写体である中間転写ベルト14aを非画像形成時（停止時）に回転せずに放置しておくと、画像形成時に先だって、定着装置17のプリントレディ状態迄に中間転写ベルト14aの予備回転を行っても、予備回転のみでは解消されない停止時のベルトの曲がり癖が中間転写ベルト14aに生じ、特に鋭角に中間転写ベルト14aが曲げられるローラ部材の1つである駆動ローラ14d位置や感光体ドラム10位置での曲がり癖が生じ、中間転写ベルト14aの曲がり癖により、感光体ドラム10上から中間転写ベルト14aへの裏面トナー像の転写時や感光体ドラム10上の表面トナー像の記録紙Pへの転写時や中間転写ベルト14a上の裏面トナー像の記録紙Pへの転写時等でのトナー像の転写抜けや、中間転写ベルト14aの曲がり癖の凹凸による各ローラ部材位置での中間転写ベルト14aの回転むらによりトナー像の乱れや転写不良が発生する。

【0056】上記問題点を解決するための、本発明の請求項1ないし3にかかわる中間転写体の曲がり癖の矯正方法について、図4ないし図7を用いて説明する。図4は、請求項1または3にかかわる中間転写体のローラ部材当接位置での曲がり癖の矯正方法の説明図であり、図5は、図4の要部拡大説明図であり、図6は、請求項2または3にかかわる中間転写体の像担持体当接位置での曲がり癖の矯正方法の説明図であり、図7は、図6の要部拡大説明図である。なお以下のローラ部材当接位置での曲がり癖の矯正方法として、曲がり癖の最も著しい駆動ローラ14d位置を例として説明するが、その他のアスローラ14j、従動ローラ14e、ガイドローラ14fおよびテンションローラ14i等のローラ部材による曲がり癖の矯正にも適用されるものである。

【0057】図4または図5によれば、中間転写体である中間転写ベルト14aは停止時において、それぞれローラ部材である駆動ローラ14dとアスローラ14j

と従動ローラ14eとガイドローラ14fとテンションローラ14iとに張架され、像担持体である感光体ドラム10に当接した状態にて保たれるので、ローラ部材としての駆動ローラ14dとのローラ部材当接位置P2で中間転写ベルト14aの曲がり癖を生じる。この曲がり癖を矯正するため、停止時の中間転写体位置が駆動ローラ14dとのローラ部材当接位置P2である部分を、感光体ドラム10との像担持体当接位置P1部分に回転して移動し、プリントが可能なプリントレディの状態迄に、感光体ドラム10との像担持体当接位置P1に維持する。プリントレディになる迄の間連続して感光体ドラム10との像担持体当接位置P1に維持することが好ましい。これにより、図5に示すように、ローラ部材当接位置P2での駆動ローラ14dによる表面側に凸状に形成される曲がり癖部分を、感光体ドラム10に当接する像担持体当接位置P1部分で裏面側に凸状にて維持し、表面側に凸状の曲がり癖を矯正する。

【0058】上記により、予備回転のみでは解消されない停止時のベルト状の中間転写体のローラ部材当接位置での曲がり癖が矯正されて、中間転写体の曲がり癖により発生する像担持体上から中間転写体への裏面トナー像の転写時や像担持体上の表面トナー像の転写材への転写時や中間転写体上の裏面トナー像の転写材への転写時等でのトナー像の転写抜けや、中間転写体の曲がり癖の凹凸による各ローラ部材位置での中間転写体の回転むらによる中間転写体上のトナー像の乱れや転写時の転写不良が防止される。

【0059】図6または図7によれば、中間転写体である中間転写ベルト14aは停止時において、それぞれローラ部材である駆動ローラ14dとアスローラ14jと従動ローラ14eとガイドローラ14fとテンションローラ14iとに張架され、像担持体である感光体ドラム10に当接した状態にて保たれるので、像担持体である感光体ドラム10との像担持体当接位置P1で中間転写ベルト14aの曲がり癖を生じる。この曲がり癖を矯正するため、停止時の中間転写体位置が感光体ドラム10との像担持体当接位置P1である部分を、ローラ部材としての駆動ローラ14dとのローラ部材当接位置P2部分に回転して移動し、プリントが可能なプリントレディの状態迄に、駆動ローラ14dとのローラ部材当接位置P2に維持する。プリントレディになる迄の間連続して駆動ローラ14dとのローラ部材当接位置P2に維持することが好ましい。これにより、図7に示すように、像担持体当接位置P1での感光体ドラム10による裏面側に凸状に形成される曲がり癖部分を、駆動ローラ14dに当接するローラ部材当接位置P2部分で表面側に凸状にて維持し、裏面側に凸状の曲がり癖を矯正する。

【0060】上記により、予備回転のみでは解消されない停止時のベルト状の中間転写体の像担持体当接位置での曲がり癖が矯正されて、中間転写体の曲がり癖により



発生する像担持体上から中間転写体への裏面トナー像の転写時や像担持体上の表面トナー像の転写材への転写時や中間転写体上の裏面トナー像の転写材への転写時等でのトナー像の転写抜けや、中間転写体の曲がり癖の凹凸による各ローラ部材位置での中間転写体の回転むらによる中間転写体上のトナー像の乱れや転写時の転写不良が防止される。

【0061】さらに上記図4および図6にて説明した、ローラ部材としての駆動ローラ14dとのローラ部材当接位置P2で生じる中間転写ベルト14aの曲がり癖および像担持体である感光体ドラム10との像担持体当接位置P1で生じる中間転写ベルト14aの曲がり癖の双方を矯正するため、停止時の中間転写体位置が駆動ローラ14dとのローラ部材当接位置P2である部分を、感光体ドラム10との像担持体当接位置P1部分に回転して移動し、感光体ドラム10との像担持体当接位置P1に維持することと、停止時の中間転写体位置が感光体ドラム10との像担持体当接位置P1である部分を、ローラ部材としての駆動ローラ14dとのローラ部材当接位置P2部分に回転して移動し、駆動ローラ14dとのローラ部材当接位置P2に維持することとを、プリントが行われるプリント状態までに繰返すことが好ましい(請求項3にかかわる発明)。

【0062】上記により、予備回転のみでは解消されない停止時のベルト状の中間転写体のローラ部材当接位置での曲がり癖および像担持体当接位置での曲がり癖が矯正されて、中間転写体の曲がり癖により発生する像担持体上から中間転写体への裏面トナー像の転写時や像担持体上の表面トナー像の転写材への転写時や中間転写体上の裏面トナー像の転写材への転写時等でのトナー像の転写抜けや、中間転写体の曲がり癖の凹凸による各ローラ部材位置での中間転写体の回転むらによる中間転写体上のトナー像の乱れや転写時の転写不良が防止される。

#### 【0063】実施形態2

また前記図1にて説明した画像形成装置において、電源onでもプリント迄の時間が長いと、中間転写ベルト14aにベルトの曲がり癖が生じ、特に鋭角に中間転写ベルト14aが曲げられるローラ部材の1つである駆動ローラ14d位置や感光体ドラム10位置での曲がり癖が生じ、中間転写ベルト14aの曲がり癖により、感光体ドラム10上から中間転写ベルト14aへの裏面トナー像の転写時や感光体ドラム10上の表面トナー像の記録紙Pへの転写時や中間転写ベルト14a上の裏面トナー像の記録紙Pへの転写時等でのトナー像の転写抜けや、中間転写ベルト14aの曲がり癖の凹凸による各ローラ部材位置での中間転写ベルト14aの回転むらによりトナー像の乱れや転写不良が発生する。

【0064】上記問題点を解決するための、本発明の請求項4または5にかかわる中間転写体の曲がり癖の矯正方法について、図8または図9を用いて説明する。図8

は、請求項4にかかわる中間転写体のローラ部材当接位置での曲がり癖の矯正方法の説明図であり、図9は、請求項5にかかわる中間転写体の像担持体当接位置での曲がり癖の矯正方法の説明図である。なお以下のローラ部材当接位置での曲がり癖の矯正方法として、曲がり癖の最も著しい駆動ローラ14d位置を例として説明するが、その他のアスローラ14j、従動ローラ14e、ガイドローラ14fおよびテンションローラ14i等のローラ部材による曲がり癖の矯正にも適用されるものである。

【0065】図8によれば、中間転写体である中間転写ベルト14aは電源onでもプリント迄の待ち状態時間が長いと、それぞれローラ部材である駆動ローラ14dとアスローラ14jと従動ローラ14eとガイドローラ14fとテンションローラ14iとに張架され、像担持体である感光体ドラム10に当接した状態にて保たれるので、ローラ部材としての駆動ローラ14dとのローラ部材当接位置P2で中間転写ベルト14aの曲がり癖を生じる。この曲がり癖を矯正するため、待ち状態では、ローラ部材当接位置P2を間欠的に平面位置P21、P22へと変更し、平面位置で中間転写ベルト14aを伸ばすことにより、曲がり癖を矯正する。

【0066】上記により、電源onでもプリント迄の待ち状態時間が長い場合に生じるベルト状の中間転写体のローラ部材当接位置での曲がり癖が矯正されて、中間転写体の曲がり癖により発生する像担持体上から中間転写体への裏面トナー像の転写時や像担持体上の表面トナー像の転写材への転写時や中間転写体上の裏面トナー像の転写材への転写時等でのトナー像の転写抜けや、中間転写体の曲がり癖の凹凸による各ローラ部材位置での中間転写体の回転むらによる中間転写体上のトナー像の乱れや転写時の転写不良が防止される。

【0067】図9によれば、中間転写体である中間転写ベルト14aは電源onでもプリント迄の待ち状態時間が長いと、それぞれローラ部材である駆動ローラ14dとアスローラ14jと従動ローラ14eとガイドローラ14fとテンションローラ14iとに張架され、像担持体である感光体ドラム10に当接した状態にて保たれるので、像担持体である感光体ドラム10との像担持体当接位置P1で中間転写ベルト14aの曲がり癖を生じる。この曲がり癖を矯正するため、待ち状態では、像担持体当接位置P1を間欠的に平面位置P11、P12へと変更し、平面位置で中間転写ベルト14aを伸ばすことにより、曲がり癖を矯正する。

【0068】上記により、電源onでもプリント迄の待ち状態時間が長い場合に生じるベルト状の中間転写体の像担持体当接位置での曲がり癖が矯正されて、中間転写体の曲がり癖により発生する像担持体上から中間転写体への裏面トナー像の転写時や像担持体上の表面トナー像の転写材への転写時や中間転写体上の裏面トナー像の転

写材への転写時等でのトナー像の転写抜けや、中間転写体の曲がり癖の凹凸による各ローラ部材位置での中間転写体の回転むらによる中間転写体上のトナー像の乱れや転写時の転写不良が防止される。

### 【0069】実施形態3

また前記図1にて説明した画像形成装置において、本願発明者らは中間転写体である中間転写ベルト14aの両端部に、中間転写ベルト14aを張架する駆動ローラ14d、アースローラ14j、従動ローラ14e、ガイドローラ14fおよびテンションローラ14i等のローラ部材の両端部に係合するベルト寄り止め部材を設けて中間転写ベルト14aの寄りを防止するよう検討しているが、中間転写ベルト14aの長期の使用によりベルト寄り止め部材がローラ部材と擦られて削られ、削れかすが中間転写ベルト14aの裏面に付着してローラ部材の間に挟まれ、中間転写ベルト14aに凹凸が形成されてしまい、アースローラ14jの上で行われる中間転写ベルト14a上の裏面トナー像の転写時に転写不良が生じたり、削れによる中間転写ベルト14aの寿命の低下が生じる。

【0070】上記問題点を解決するための、本発明の請求項6ないし8にかかわるベルト寄り止め部材の削れ防止方法について、図10または図11を用いて説明する。図10は、請求項6または7にかかわるベルト寄り止め部材の削れ防止方法の説明図であり、図11は、請求項8にかかわるベルト寄り止め部材の削れ防止方法の説明図である。なお以下のベルト寄り止め部材の削れ防止の説明において、ローラ部材として駆動ローラ14dを例として説明するが、その他の、アースローラ14j、従動ローラ14e、ガイドローラ14fおよびテンションローラ14i等のローラ部材にも適用されるものである。またローラ部材としての駆動ローラ14dの一方の側のみについて示すが、これと対称に他方の側も構成されるものである。

【0071】図10によれば、中間転写体である中間転写ベルト14aの両端部には、例えばゴム部材を用いたベルト寄り止め部材であるベルト寄り防止突条141が設けられる。一方、中間転写ベルト14aを張架するローラ部材としての駆動ローラ14dは、両端の回転軸243と、回転軸243を中心として回転されるローラ本体部241及びローラ本体部241の両端の段差部242とにて構成され、段差部242にベルト寄り防止突条141が嵌込まれた状態で中間転写ベルト14aが回転される。

【0072】従来、ベルト寄り防止突条141が駆動ローラ14dと当接するローラ本体部241の角部（ローラ部材角部）CNは90°か0.1〜0.5mm程度の面取り（斜めカット）であったが、これでは削れかすが多くでて前述した問題点が生じるので、ローラ部材角部CNに曲面をつけて削れを防止する。

【0073】ローラ部材角部CNでのベルト寄り防止突条141の削れが少なくなるよう、ベルト寄り止め部材であるベルト寄り防止突条141の厚さを $t$ （mm）、ローラ部材角部CNの曲面の半径を $r$ （mm）とすると、 $t/5 \leq r \leq t/3$ とする。

【0074】ローラ部材角部CNの曲面の半径 $r$ がベルト寄り防止突条141の厚さ $t$ の1/5未満（ $r < t/5$ ）では削れが多くなり、ローラ部材角部CNの曲面の半径 $r$ がベルト寄り防止突条141の厚さ $t$ の1/3を越え（ $r > t/3$ ）ではベルト寄り防止突条141が駆動ローラ14dのローラ本体部241に乗り上げてしまうことが実験的に確認された。さらに、この際用いられるベルト寄り防止突条141の厚さ $t$ を、0.8〜1.5mmとすることが好ましい。ベルト寄り防止突条141の厚さ $t$ が0.8mm未満で薄すぎると、ベルト寄り防止突条141がローラ本体部241に乗り上げ易くなり、また、ベルト寄り防止突条141が1.5mmを越えて厚すぎると、中間転写ベルト14aの腰が強くなり、駆動ローラ14d回転時に中間転写ベルト14aの負荷がかかり駆動ローラ14dの回転が一樣にならなかつたり、両端が強く張られ中間転写ベルト14aの中央部が波打ちベルト面が均一に保たれない。また、ベルト寄り防止突条141のローラ部材への巻き付き部の入口部と出口部においてベルト寄り防止突条141のローラ本体部241端部との接触面に加わる抵抗が増し、ベルト寄り防止突条141削れによる中間転写ベルト14aの寿命が短くなる。

【0075】上記により、ベルト寄り止め部材によりベルト状の中間転写体の寄りが防止されると共に、ベルト寄り止め部材のローラ部材角部との擦れによる削れが防止され、削れかすがベルト状の中間転写体裏面に付着してローラ部材の間に挟まれ、中間転写体に凹凸が形成されてしまうことにより発生する転写不良や削れによる中間転写体の寿命の低下が防止される。

【0076】また駆動ローラ14dを含むローラ部材としては外径が5〜30mm程度のものを用いているが、ベルト寄り防止突条141のローラ部材への巻き付き部の入口部と出口部においてベルト寄り防止突条141のローラ本体部241端部での接触面へ加わるベルト寄り防止突条141の寄りによる押圧の変動により、駆動ローラ14dの回転が一樣とならない。このため、図11のように、例えば摩擦係数が小さく摩擦の少ないポリアセタールの樹脂部材により回動部材である回動ローラ341を構成し、駆動ローラ14dの両端部に回転軸243を通して回動ローラ341を挿入する。さらに回動ローラ341の回転を良好とするため、回動ローラ341のローラ本体部241との接触面を少なくし、回動ローラ341がローラ本体部241とできるだけフリーに回転されるようにする。このため、回動部材である回動ローラ341とローラ部材としての駆動ローラ14dの側

面との接触面の最大径を $R1$  (mm)、駆動ローラ14dの中間転写体である中間転写ベルト14aの張架部の最大径を $R2$  (mm)とすると、

$$(R1/R2) < 1/2$$

とする。これにより、ベルト寄り防止突条141のローラ部材への巻き付き部の入口部と出口部においてベルト寄り防止突条141の接触面で加わる抵抗が、直接駆動ローラ14dに加わらず、フリーな状態とされて回転される回動ローラ341を介して弱められて加わるので、ベルト寄り防止突条141の削れが低減され中間転写ベルト14aの寿命が向上される。 $R1/R2$ が $1/2$ 以上では回動ローラ341のローラ本体部241との接触が大きすぎ、駆動ローラ14dがフリーになることがなくなり、回動ローラ341を設ける意味合いがなくなる。

【0077】上記により、ベルト寄り止め部材によりベルト状の中間転写体の寄りが防止されると共に、ローラ部材との接触面での抵抗の少ない回動部材により、ベルト寄り止め部材の削れが防止され、削れかすがベルト状の中間転写体裏面に付着してローラ部材の間に挟まれ、中間転写体に凹凸が形成されてしまうことにより発生する転写時の転写不良や削れによる中間転写体の寿命の低下が防止される。

#### 【0078】実施形態4

また前記図1にて説明した画像形成装置において、本願発明者らは中間転写体である中間転写ベルト14aの両端部に、中間転写ベルト14aを張架する駆動ローラ14d、アースローラ14j、従動ローラ14e、ガイドローラ14fおよびテンションローラ14i等のローラ部材の両端部に係合するベルト寄り止め部材を設けて中間転写ベルト14aの寄りを防止するよう検討しているが、中間転写ベルト14aがローラ部材側に寄ってくると、中間転写ベルト14aがローラ部材端部上面に乗り上げては落下し、中間転写ベルト14aとローラ部材との間でバンという落下音が起こる。この中間転写ベルト14aの乗り上げ・落下の際に、中間転写ベルト14aの駆動むら生じ、中間転写ベルト14aの駆動むらによる中間転写ベルト14a上のトナー像の乱れや転写時の転写不良が発生する。

【0079】上記問題点を解決するための、本発明の請求項9ないし12にかかわるベルト寄り止め部材の乗り上げ防止方法について、図12ないし図15を用いて説明する。図12は、請求項9にかかわるガイド部材によるベルト寄り止め部材の乗り上げ防止方法の説明図であり、図13は、図12のガイド部材の配置と請求項10にかかわるガイド部材の好ましい配置との説明図であり、図14は、請求項11にかかわる押圧部材によるベルト寄り止め部材の乗り上げ防止方法の説明図であり、図15は、図14の押圧部材の配置と請求項12にかかわる押圧部材の好ましい配置との説明図である。なお以

下のベルト寄り止め部材の乗り上げ防止の説明において、図12または図14においてはローラ部材として駆動ローラ14dを例として説明するが、テンションローラ14iを除くその他の、アースローラ14j、従動ローラ14eおよびガイドローラ14f等のローラ部材にも適用されるものである。

【0080】図12または図13によれば、中間転写体である中間転写ベルト14aは、駆動ローラ14dとアースローラ14jと従動ローラ14eとガイドローラ14fとテンションローラ14iとに張架される。中間転写ベルト14aの両端部には、例えばゴム部材を用いたベルト寄り止め部材であるベルト寄り防止突条141が設けられ、一方、中間転写ベルト14aを張架するテンションローラ14iを除くローラ部材としての駆動ローラ14dとアースローラ14jと従動ローラ14eとガイドローラ14fとは、両端の回転軸243と、回転軸243を中心として回転されるローラ本体部241及びローラ本体部241の両端の段差部242とにて構成され、ベアリングB3がローラ部材両端部の回転軸243に嵌込まれ、ベアリングB3を収納する両端部のベアリングケース71が両端部の中間転写体基板70に取付けられて、テンションローラ14iを除くローラ部材が中間転写体基板70に固定される。テンションローラ14iを除くローラ部材のローラ本体部241の両端の段差部242にベルト寄り防止突条141が嵌込まれた状態で中間転写ベルト14aが回転される。

【0081】ベルト寄り防止突条141が回転中に浮き上がって、ローラ部材の1つである駆動ローラ14dのローラ本体部241端部表面上に乗り上げないように、駆動ローラ14dの両端部に、中間転写ベルト14aを挟みベルト寄り防止突条141と対向して中間転写ベルト14aの端部をガイドするガイド部材であるガイド板171を設ける。ガイド板171は例えばゴム材や樹脂材等の板状の部材で中間転写ベルト14a側面に滑り性の良いテフロンコートを施したものが用いられ、中間転写体基板70に取付けられるL字状の板部材を用いたホルダ板172に取付けられる。ガイド板171は中間転写ベルト14aと間隙dをもって取付けられており、 $0.8 \sim 1.5$  mmのベルト寄り防止突条141の厚さtに対して、間隙dが $(1/3) \times t$ 以下( $d \leq (1/3) \times t$ で、 $d \leq 0.5$  mm)であることが好ましく、間隙dが $(1/3) \times t$ を越えると、ベルト寄り防止突条141が乗り上げはしないが、ローラ本体部241の端部と擦れ削れが生じ、削れかすが中間転写ベルト14aの裏面に付着して駆動ローラ14dの間に挟まれ、中間転写ベルト14aに凹凸が形成されてしまうことにより発生する転写時の転写不良や、削れによる中間転写ベルト14aの寿命低下が生じる。ガイド板171は中間転写ベルト14aと当接状態とされてもよい。ベルト寄り防止突条141の厚さtが $0.8$  mm未満で薄すぎる

と、ベルト寄り防止突条141がローラ本体部241に乗り上げ易くなり、また、ベルト寄り防止突条141が1.5mmを越えて厚すぎると、中間転写ベルト14aの腰が強くなり、駆動ローラ14d回転時に中間転写ベルト14aの負荷がかかり駆動ローラ14dの回転が一樣にならなかったり、両端が強く張られ中間転写ベルト14aの中央部が波打ちベルト面が均一に保たれない。

【0082】また図13に示すように、像担持体である感光体ドラム10と接する中間転写ベルト14aの平面に沿ってガイド板171を設けることが好ましい。即ち本実施形態の場合は、駆動ローラ14d、アースローラ14jおよび従動ローラ14eの上側で、中間転写ベルト14aと平行にガイド板171を配置することが好ましい。これにより、中間転写ベルト14aのしわや浮き上がりが防止され、感光体ドラム10と接する中間転写ベルト14aの平面での中間転写ベルト14aのしわや浮きにより生じる転写むらや画像こすれが防止される。

【0083】上記におけるガイド部材としては、前記ガイド板171の代わりに例えばゴム材や樹脂材のロール状の部材の表面に滑り性の良いテフロンコートをしたものをを用いてもよい。

【0084】上記により、ベルト寄り止め部材によりベルト状の中間転写体の寄りが防止されると共に、ベルト寄り止め部材のローラ部材への乗り上げ・落下が防止され、乗り上げ・落下時の中間転写体の駆動むらにより発生する中間転写体上のトナー像の乱れや転写時の転写不良が防止される。

【0085】図14または図15によれば、中間転写体である中間転写ベルト14aは、駆動ローラ14dとアースローラ14jと従動ローラ14eとガイドローラ14fとテンションローラ14iとに張架される。中間転写ベルト14aの両端部には、例えばゴム部材を用いたベルト寄り止め部材であるベルト寄り防止突条141が設けられ、一方、中間転写ベルト14aを張架するテンションローラ14iを除くローラ部材としての駆動ローラ14dとアースローラ14jと従動ローラ14eとガイドローラ14fとは、両端の回転軸243と、回転軸243を中心として回転されるローラ本体部241及びローラ本体部241の両端の段差部242とにて構成され、ベアリングB3がローラ部材両端部の回転軸243に嵌込まれ、ベアリングB3を収納する両端部のベアリングケース71が両端部の中間転写体基板70に取付けられて、テンションローラ14iを除くローラ部材が中間転写体基板70に固定される。テンションローラ14iを除くローラ部材のローラ本体部241の両端の段差部242にベルト寄り防止突条141が嵌込まれた状態で中間転写ベルト14aが回転される。

【0086】ベルト寄り防止突条141が回転中に浮き上がって、ローラ部材の1つである駆動ローラ14dのローラ本体部241端部表面上に乗り上げないように、

駆動ローラ14dの両端部に、中間転写ベルト14aと当接しベルト寄り防止突条141と対向して中間転写ベルト14aの端部を押圧する押圧部材である押圧ローラ271を設ける。押圧ローラ271は例えばゴム材や樹脂材等のロール状の部材で表面に滑り性の良いテフロンコートを施したものが用いられ、中間転写体基板70に取付けられる板部材を用いたホルダ板272に設けられる回転軸273に嵌込まれてEリングERにて止められ、回転軸243に回転可能に取付けられる。押圧ローラ271はホルダ板272の取付時に、中間転写ベルト14aの端部の変形や回転不良を起こさぬように、その押圧力を0.5〜3.0grに調節して固定され、中間転写ベルト14aに従動して回転される。

【0087】また図15に示すように、像担持体である感光体ドラム10と接する中間転写ベルト14aの平面に沿って押圧ローラ271を設けることが好ましい。即ち本実施形態の場合は、駆動ローラ14d、アースローラ14jおよび従動ローラ14eの上側に押圧ローラ271を配置することが好ましい。これにより、中間転写ベルト14aのしわや浮き上がりが防止され、感光体ドラム10と接する中間転写ベルト14aの平面での中間転写ベルト14aのしわや浮きにより生じる転写むらや画像こすれが防止される。

【0088】上記における押圧部材としては、前記押圧ローラ271の代わりに例えばゴム材や樹脂材の板状の部材の表面に滑り性の良いテフロンコートを施したものをを用いてもよい。

【0089】上記により、ベルト寄り止め部材によりベルト状の中間転写体の寄りが防止されると共に、ベルト寄り止め部材のローラ部材への乗り上げ・落下が防止され、乗り上げ・落下時の中間転写体の駆動むらにより発生する中間転写体上のトナー像の乱れや転写時の転写不良が防止される。

【0090】上記の各実施形態にて説明した本発明の各請求項に共通する画像形成装置の他の実施形態について図16にて説明する。図16は、本発明の各請求項に共通する画像形成装置の他の実施形態を示すカラー画像形成装置の概要説明図である。

【0091】本例の画像形成装置では、図16に示すように、裏面画像となるトナー像（裏面トナー像）を形成する第1の像担持体である感光体ドラム10bと、表面画像となるトナー像（表面トナー像）を形成する第2の像担持体である感光体ドラム10aとをそれぞれ別々に設け、感光体ドラム10bに形成した裏面トナー像を、トナーと反対極性（本実施形態においてはプラス極性）の電圧が印加される1次転写器114bにより中間転写体である中間転写ベルト114a上に転写した後、感光体ドラム10bと感光体ドラム10aとの間で中間転写ベルト114a上に転写材である記録紙Pを供給し、中間転写ベルト114aを挟んでアースローラ14kと対

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向して設けられる紙帯電器150の帯電により、記録紙Pを中間転写ベルト114aに吸着させて搬送し、感光体ドラム10a上に形成した表面トナー像を、トナーと反対極性（本実施形態においてはプラス極性）の電圧が印加される2次転写器114cにより記録紙Pの表面に転写した後、中間転写ベルト114a上の裏面トナー像を、トナーと反対極性（本実施形態においてはプラス極性）の電圧が印加される3次転写器114gにより記録紙Pの裏面に転写して、記録紙P上に表裏のトナー像を形成し、両面にカラートナー像が形成された記録紙Pを、中間転写ベルト114aの曲率部KTの曲率と、中間転写ベルト114aの端部に必要に応じて設けられる転写材分離手段としての紙分離AC除電器14hによる除電作用と、中間転写ベルト114aと所定の間隔を空けて搬送部160に設けられる分離爪210とにより、中間転写ベルト114aから分離し、搬送部160に設けられた拍車部材である拍車162を通して定着手段としての定着装置17へと搬送し、第1定着ローラ17aと第2定着ローラ17bとの間のニップ部Tで記録紙P上のトナー像を定着し、両面画像を得るようにするものである。

【0092】本例の画像形成装置における感光体ドラム10a、10bや中間転写ベルト114aは、前記画像形成装置にて説明した感光体ドラム10や中間転写ベルト14aと同様な機能、構造のものが用いられる。中間転写ベルト114aは、それぞれローラ部材である駆動ローラ14dとアスローラ14jとアスローラ14kと従動ローラ14eとガイドローラ14fとテンションローラ14iとに内接して張架される。また、それぞれ除電手段である除電器114m、114nが、中間転写ベルト114aの移動方向に対し、1次転写器114b及び2次転写器114cの後に、1次転写器114b及び2次転写器114cと並列して設けられ、トナーと同極性または逆極性の直流電圧を重畳した交流電圧が印加され、1次転写器114b及び2次転写器114cの電圧印加により荷電される中間転写ベルト114aの電荷を除電する。

【0093】裏面画像となるトナー像を第1の像担持体である感光体ドラム10bに形成する手段と表面画像となるトナー像を第2の像担持体である感光体ドラム10aに形成する手段とは、前述した画像形成装置にて用いられたと同様な、イエロー（Y）、マゼンタ（M）、シアン（C）および黒色（K）の画像形成プロセス用の4組の現像器13（現像手段）、スコロトロン帯電器11（帯電手段）、露光光学系12（画像書込手段）が感光体ドラム10b、10aに対してそれぞれに用いられ、裏面画像のトナー像と表面画像のトナー像とをそれぞれ形成する。

【0094】また本例においても、図4または図5にて説明したと同様にして、停止時の中間転写体位置がロー

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ラ部材当接位置である部分を、プリント状態までに、第1の像担持体当接位置或いは第2の像担持体当接位置に維持することによる、駆動ローラ14d、アスローラ14j、アスローラ14k、従動ローラ14eおよびガイドローラ14f等のローラ部材との中間転写ベルト114aのローラ部材当接位置での中間転写ベルト114aの曲がり癖の矯正が行われる。これにより、予備回転のみでは解消されない停止時のベルト状の中間転写体のローラ部材当接位置での曲がり癖が矯正されて、中間転写体の曲がり癖により発生する第1の像担持体上から中間転写体への裏面トナー像の転写時や第2の像担持体上の表面トナー像の転写材への転写時や中間転写体上の裏面トナー像の転写材への転写時等でのトナー像の転写抜けや、中間転写体の曲がり癖の凹凸による各ローラ部材位置での中間転写体の回転むらによる中間転写体上のトナー像の乱れや転写時の転写不良が防止される。

【0095】また図6または図7にて説明したと同様にして、停止時の中間転写体位置が第1の像担持体当接位置或いは第2の像担持体当接位置である部分を、プリント状態までに、駆動ローラ14d、アスローラ14j、アスローラ14k、従動ローラ14eおよびガイドローラ14f等のローラ部材とのローラ部材当接位置に維持することによる、第1の像担持体である感光体ドラム10b或いは第2の像担持体である感光体ドラム10aとの中間転写ベルト114aの第1の像担持体当接位置或いは第2の像担持体当接位置での中間転写ベルト114aの曲がり癖の矯正が行われる。これにより、予備回転のみでは解消されない停止時のベルト状の中間転写体の第1の像担持体当接位置或いは第2の像担持体当接位置での曲がり癖が矯正されて、中間転写体の曲がり癖により発生する第1の像担持体上から中間転写体への裏面トナー像の転写時や第2の像担持体上の表面トナー像の転写材への転写時や中間転写体上の裏面トナー像の転写材への転写時等でのトナー像の転写抜けや、中間転写体の曲がり癖の凹凸による各ローラ部材位置での中間転写体の回転むらによる中間転写体上のトナー像の乱れや転写時の転写不良が防止される。

【0096】さらに、停止時の中間転写体位置がローラ部材当接位置である部分を、プリント状態までに、第1の像担持体当接位置或いは第2の像担持体当接位置に維持することと、停止時の中間転写体位置が第1の像担持体当接位置或いは第2の像担持体当接位置である部分を、プリント状態までに、ローラ部材当接位置に維持することとを繰返すことにより、駆動ローラ14d、アスローラ14j、従動ローラ14eおよびガイドローラ14f等のローラ部材のローラ部材当接位置で生じる中間転写ベルト114aの曲がり癖および感光体ドラム10bや感光体ドラム10aとの第1の像担持体当接位置や第2の像担持体当接位置で生じる中間転写ベルト114aの双方の曲がり癖の矯正が行われる。これにより、

予備回転のみでは解消されない停止時のベルト状の中間転写体のローラ部材当接位置での曲がり癖および第1の像担持体当接位置や第2の像担持体当接位置での曲がり癖が矯正されて、中間転写体の曲がり癖により発生する第1の像担持体上から中間転写体への裏面トナー像の転写時や第2の像担持体上の表面トナー像の転写材への転写時や中間転写体上の裏面トナー像の転写材への転写時等でのトナー像の転写抜けや、中間転写体の曲がり癖の凹凸による各ローラ部材位置での中間転写体の回転むらによる中間転写体上のトナー像の乱れや転写時の転写不良が防止される。

【0097】また図8にて説明したと同様にして、待ち状態では、ローラ部材当接位置を間欠的に変更することによる、電源onでもプリント迄の時間が長い場合での中間転写ベルト114aの駆動ローラ14d、アースローラ14j、アースローラ14k、従動ローラ14eおよびガイドローラ14f等のローラ部材とのローラ部材当接位置での中間転写ベルト114aの曲がり癖の矯正が行われる。これにより、電源onでもプリント迄の待ち状態時間が長い場合に生じるベルト状の中間転写体のローラ部材当接位置での曲がり癖が矯正されて、中間転写体の曲がり癖により発生する第1の像担持体上から中間転写体への裏面トナー像の転写時や第2の像担持体上の表面トナー像の転写材への転写時や中間転写体上の裏面トナー像の転写材への転写時等でのトナー像の転写抜けや、中間転写体の曲がり癖の凹凸による各ローラ部材位置での中間転写体の回転むらによる中間転写体上のトナー像の乱れや転写時の転写不良が防止される。

【0098】また図9にて説明したと同様にして、待ち状態では、第1の像担持体当接位置或いは第2の像担持体当接位置を間欠的に変更することによる、電源onでもプリント迄の時間が長い場合での中間転写ベルト114aの感光体ドラム10b或いは感光体ドラム10aとの第1の像担持体当接位置或いは第2の像担持体当接位置での中間転写ベルト114aの曲がり癖の矯正が行われる。これにより、電源onでもプリント迄の待ち状態時間が長い場合に生じるベルト状の中間転写体の第1の像担持体当接位置或いは第2の像担持体当接位置での曲がり癖が矯正されて、中間転写体の曲がり癖により発生する第1の像担持体上から中間転写体への裏面トナー像の転写時や第2の像担持体上の表面トナー像の転写材への転写時や中間転写体上の裏面トナー像の転写材への転写時等でのトナー像の転写抜けや、中間転写体の曲がり癖の凹凸による各ローラ部材位置での中間転写体の回転むらによる中間転写体上のトナー像の乱れや転写時の転写不良が防止される。

【0099】また図10にて説明したと同様にして、中間転写体の両端部にベルト寄り止め部材を設けると共に、ベルト寄り止め部材を受けるローラ部材角部に曲面を設け、ベルト寄り止め部材の厚さを $t$  (mm)、ロー

ラ部材角部の曲面の半径を $r$  (mm)とすると、 $t/5 \leq r \leq t/3$

とすること、好ましくはベルト寄り止め部材の厚さ $t$ を、 $0.8 \sim 1.5$  mmとすることによる、駆動ローラ14d、アースローラ14j、従動ローラ14eおよびガイドローラ14f等のローラ部材のローラ部材角部との擦れによるベルト寄り止め部材の削れ防止が行われる。これにより、ベルト寄り止め部材によりベルト状の中間転写体の寄りが防止されると共に、ベルト寄り止め部材のローラ部材角部との擦れによる削れが防止され、削れかすがベルト状の中間転写体裏面に付着してローラ部材の間に挟まれ、中間転写体に凹凸が形成されてしまうことにより発生する転写不良や削れによる中間転写体の寿命の低下が防止される。

【0100】また図11にて説明したと同様にして、中間転写体の両端部にベルト寄り止め部材を設けると共に、ローラ部材の両側端にベルト寄り止め部材を受ける回動部材を設け、回動部材とローラ部材の側面との接触面の最大径を $R1$  (mm)、ローラ部材の中間転写体の張架部の最大径を $R2$  (mm)とすると、

$$(R1/R2) < 1/2$$

とすることにより、回動部材を設けてのベルト寄り止め部材の削れ防止が行われる。これにより、ベルト寄り止め部材によりベルト状の中間転写体の寄りが防止されると共に、ローラ部材との接触面での抵抗の少ない回動部材により、ベルト寄り止め部材の削れが防止され、削れかすがベルト状の中間転写体裏面に付着してローラ部材の間に挟まれ、中間転写体に凹凸が形成されてしまうことにより発生する転写時の転写不良や削れによる中間転写体の寿命の低下が防止される。

【0101】また図12または図13にて説明したと同様にして、中間転写体の両端部にベルト寄り止め部材を設けると共に、ローラ部材の少なくとも何れか1つの両端部に、中間転写体を挟みベルト寄り止め部材と対向して中間転写体の端部をガイドするガイド部材を設けることによる、テンションローラ14iを除くローラ部材としての駆動ローラ14dやアースローラ14jやアースローラ14kや従動ローラ14eやガイドローラ14fへのガイド部材を用いたベルト寄り止め部材の乗り上げ防止が行われる。これにより、ガイド部材を用いたベルト寄り止め部材によりベルト状の中間転写体の寄りが防止されると共に、ベルト寄り止め部材のローラ部材への乗り上げ・落下が防止され、乗り上げ・落下時の中間転写体の駆動むらにより発生する中間転写体上のトナー像の乱れや転写時の転写不良が防止される。

【0102】さらに、像担持体に当接する中間転写体の平面に沿ってガイド部材を設けることが、ベルト状の中間転写体のしわや浮き上がりが防止され、像担持体と接する中間転写体の平面での中間転写体のしわや浮きにより生じる転写むらや画像こすれが防止されて好ましい。

【0103】また図14または図15にて説明したと同様に、中間転写体の両端部にベルト寄り止め部材を設けると共に、ローラ部材の少なくとも何れか1つの両端部に、ベルト寄り止め部材と対向して中間転写体の端部表面を押圧する押圧部材を設けることによる、テンションローラ14iを除くローラ部材としての駆動ローラ14dやアースローラ14jやアースローラ14kや従動ローラ14eやガイドローラ14fへの押圧部材を用いたベルト寄り止め部材の乗り上げ防止が行われる。これにより、押圧部材を用いたベルト寄り止め部材によりベ

ルト状の中間転写体の寄りが防止されると共に、ベルト寄り止め部材のローラ部材への乗り上げ・落下が防止され、乗り上げ・落下時の中間転写体の駆動むらにより発生する中間転写体上のトナー像の乱れや転写時の転写不良が防止される。

【0104】さらに、像担持体に当接する中間転写体の平面に沿って押圧部材を設けることが、ベルト状の中間転写体のしわや浮き上がりが防止され、像担持体と接する中間転写体の平面での中間転写体のしわや浮きにより生じる転写むらや画像こすれが防止されて好ましい。

【0105】なお、上記図1或いは図16の画像形成装置の各例では像担持体上に直接トナー像を形成したが、像担持体とは別に像形成体を設け、該像形成体上に形成したトナー像を像担持体上に担持させてもよい。また、上記画像形成装置の各例としてカラー画像形成装置にて説明したが、本発明は必ずしもこれに限定されるものでなく、図1或いは図16にて説明したと同様のプロセスによるモノクロの画像形成装置にも適用されるものである。

【0106】さらに、本発明の画像形成装置では、上述の各画像形成装置で説明したような転写材の両面に画像を形成する両面画像形成のほかに、転写材の表面または裏面のみの片側に画像を形成する片面画像形成もなされ得ることは勿論である。

【0107】  
【発明の効果】請求項1ないし3によれば、予備回転のみでは解消されない停止時のベルト状の中間転写体の曲がり癖が矯正されて、中間転写体の曲がり癖により発生するトナー像の転写抜けや中間転写体の回転むらによる中間転写体上のトナー像の乱れや転写時の転写不良が防止される。

【0108】請求項4または5によれば、電源onでもプリント迄の待ち状態時間が長い場合に生じるベルト状の中間転写体の曲がり癖が矯正されて、中間転写体の曲がり癖により発生するトナー像の転写抜けや中間転写体の回転むらによる中間転写体上のトナー像の乱れや転写時の転写不良が防止される。

【0109】請求項6または7によれば、ベルト寄り止め部材によりベルト状の中間転写体の寄りが防止されると共に、ベルト寄り止め部材のローラ部材角部との擦れ

による削れが防止され、削れかすがベルト状の中間転写体裏面に付着してローラ部材の間に挟まれ、中間転写体に凹凸が形成されてしまうことにより発生する転写不良や削れによる中間転写体の寿命の低下が防止される。

【0110】請求項8によれば、ベルト寄り止め部材によりベルト状の中間転写体の寄りが防止されると共に、ローラ部材との接触面での抵抗の少ない回動部材により、ベルト寄り止め部材の削れが防止され、削れかすがベルト状の中間転写体裏面に付着してローラ部材の間に挟まれ、中間転写体に凹凸が形成されてしまうことにより発生する転写時の転写不良や削れによる中間転写体の寿命の低下が防止される。

【0111】請求項9ないし12によれば、ベルト寄り止め部材によりベルト状の中間転写体の寄りが防止されると共に、ベルト寄り止め部材のローラ部材への乗り上げ・落下が防止され、乗り上げ・落下時の中間転写体の駆動むらにより発生する中間転写体上のトナー像の乱れや転写時の転写不良が防止される。

【図面の簡単な説明】

20 【図1】本発明の各請求項に共通する画像形成装置の一実施形態を示すカラー画像形成装置の断面構成図である。

【図2】図1の像担持体の側断面図である。

【図3】本発明の各請求項に共通する画像形成装置におけるトナー像形成状態を示す図である。

【図4】請求項1または3にかかわる中間転写体のローラ部材当接位置での曲がり癖の矯正方法の説明図である。

【図5】図4の要部拡大説明図である。

30 【図6】請求項2または3にかかわる中間転写体の像担持体当接位置での曲がり癖の矯正方法の説明図である。

【図7】図6の要部拡大説明図である。

【図8】請求項4にかかわる中間転写体のローラ部材当接位置での曲がり癖の矯正方法の説明図である。

【図9】請求項5にかかわる中間転写体の像担持体当接位置での曲がり癖の矯正方法の説明図である。

【図10】請求項6または7にかかわるベルト寄り止め部材の削れ防止方法の説明図である。

【図11】請求項8にかかわるベルト寄り止め部材の削れ防止方法の説明図である。

【図12】請求項9にかかわるガイド部材によるベルト寄り止め部材の乗り上げ防止方法の説明図である。

【図13】図12のガイド部材の配置と請求項10にかかわるガイド部材の好ましい配置との説明図である。

【図14】請求項11にかかわる押圧部材によるベルト寄り止め部材の乗り上げ防止方法の説明図である。

【図15】図14の押圧部材の配置と請求項12にかかわる押圧部材の好ましい配置との説明図である。

【図16】本発明の各請求項に共通する画像形成装置の他の実施形態を示すカラー画像形成装置の概要説明図で

ある。

【符号の説明】

10, 10a, 10b 感光体ドラム

11 スコロトン帯電器

12 露光光学系

13 現像器

14a, 114a 中間転写ベルト

14c 転写器

14d 駆動ローラ

14e 従動ローラ

14f ガイドローラ

14g 裏面転写器

14h 紙分離AC除電器

14i テンションローラ

14j, 14k アースローラ

14m, 114m, 114n 除電器

17 定着装置

114b 1次転写器

114c 2次転写器

114g 3次転写器

141 ベルト寄り防止突条

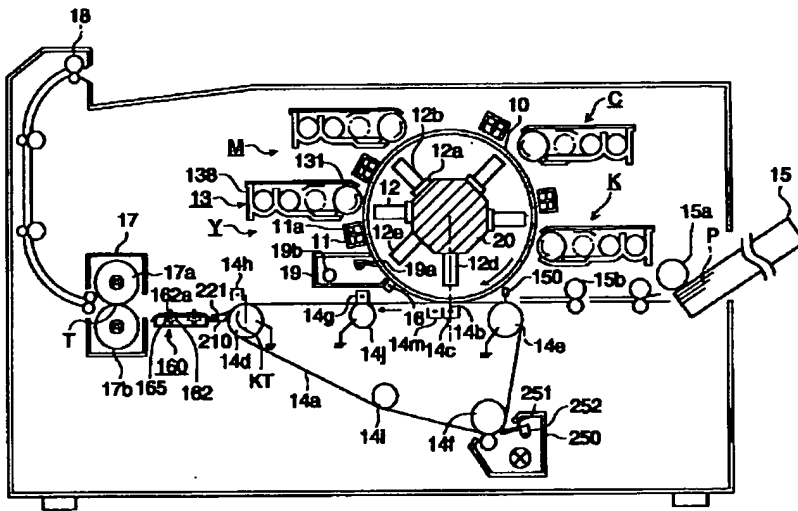
171 ガイド板

10 271 押圧ローラ

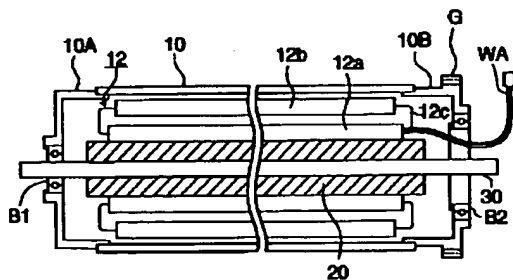
341 回動ローラ

P 記録紙

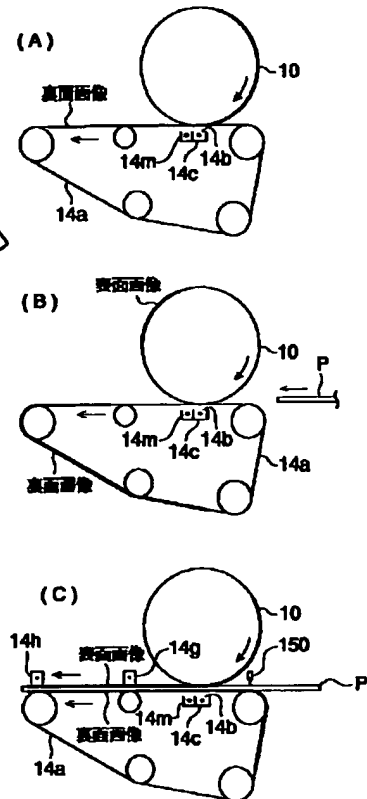
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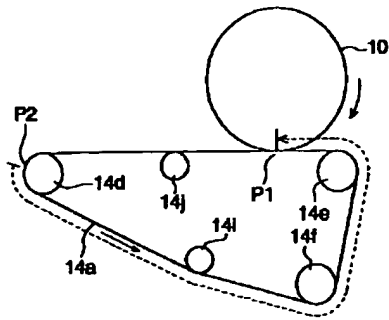


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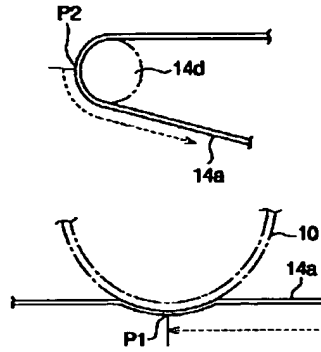




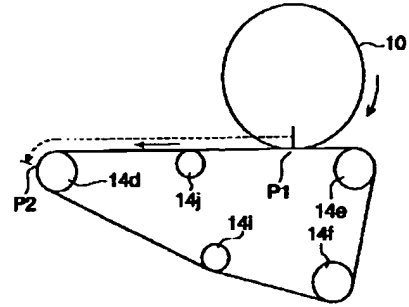
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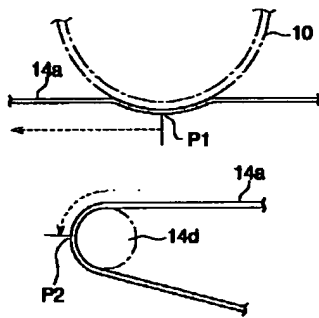
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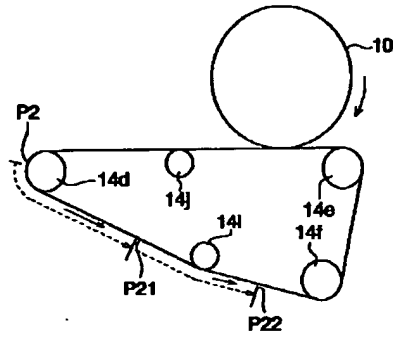
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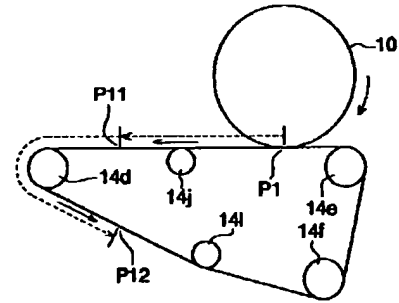
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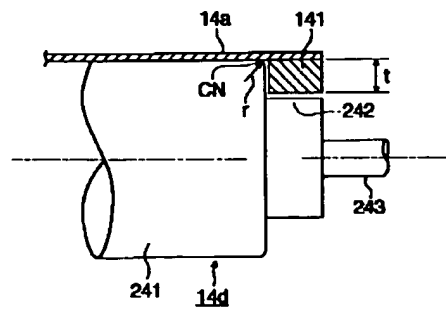
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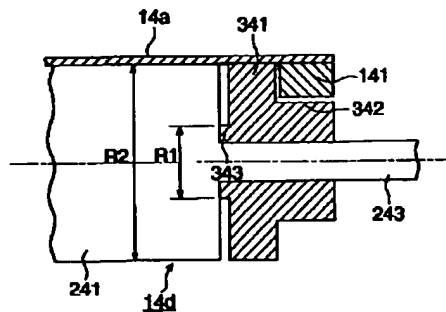
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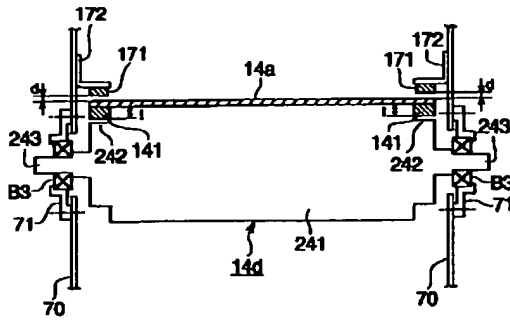
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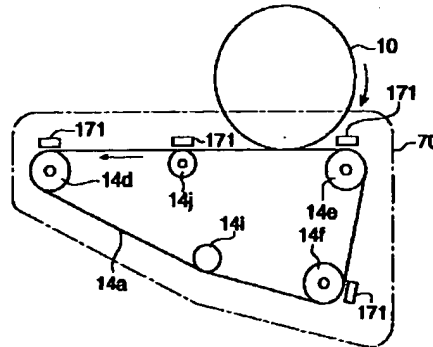
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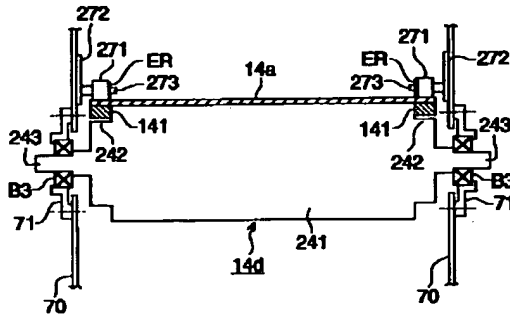
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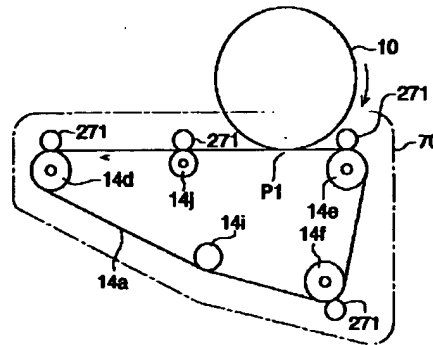
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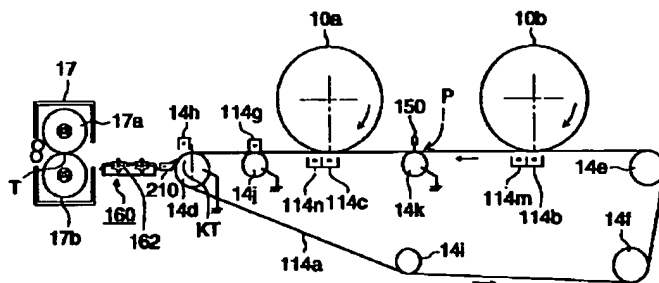
【図14】



【図15】



【図16】



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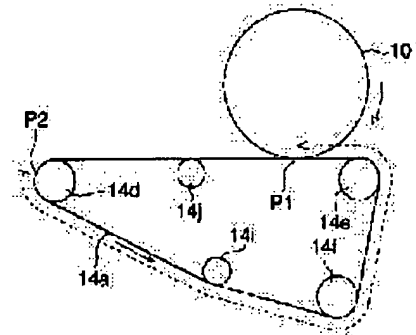
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## (54) IMAGE FORMING DEVICE

### (57)Abstract:

PROBLEM TO BE SOLVED: To prevent disturbance of a toner image on an intermediate transfer body and the occurrence of transfer failure during transfer, by keeping a portion of an intermediate transfer body, which is situated in a roller-member contact position when the intermediate transfer body is stopped, in an image-carrier contact position by the time until printing is ready.

SOLUTION: When stopped, an intermediate transfer belt 14a as an intermediate transfer body is stretched between a drive roller 14d, a ground roller 14j, a follower roller 14e, a guide roller 14f, and a tension roller 14i, all of which are roller members, and is kept in contact with a photoreceptor drum 10 being an image carrier. Therefore, habitual curvature in the intermediate transfer belt 14a occurs in a roller-member contact position P2 where it contacts the drive roller 14d being the roller member. In order to eliminate the habitual curvature, a portion of the intermediate transfer body situated in the roller-member contact position P2 where it contacts the drive roller 14d when stopped is turned and moved to an image-carrier contact position P1 where it contacts the photoreceptor drum 10. By the time printing is ready, that is, printing becomes possible, the portion is kept in the image-carrier contact position P1 where it contacts the photoreceptor drum 10.



## LEGAL STATUS

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**\* NOTICES \***

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1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

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**DETAILED DESCRIPTION**

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[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] This invention relates about image-formation equipments, such as a copying machine which imprints the toner image formed in image support on imprint material, a printer, and FAX, to the image-formation equipment which can form an image especially in both sides of imprint material, for example, the image-formation equipment of the electrophotography method which can arrange an electrification means, an image write-in means, and a development means, and can form an image around image support to both sides of imprint material.

[0002]

[Description of the Prior Art] It sets to double-sided image formation conventionally, and the image and the timing which imprinted the image of a field on imprint material, were established, once contained this to the double-sided reversal feeding device, and were again formed on image support are doubled, it feeds with imprint material from a double-sided reversal feeding device, and the method which imprints the image of the field of another side and is established on imprint material is taken. forming on image support ]

[0003] With this double-sided image formation equipment, since conveyance of imprint material, such as letting the feed and anchorage device to a double-sided reversal feeding device pass twice like the above, was performed, the reliability of imprint material conveyance was low and it had become the cause which causes a jam, a wrinkling, etc. of imprint material.

[0004] On the other hand, what is established at once after forming a toner image in both sides of imprint material using image support and a medium imprint object with JP,49-37538,B, a 54-28740 official report, JP,1-44457,A, a 4-214576 official report, etc. is proposed.

[0005] Invention-in-this-application persons around a photo conductor drum (image support) Moreover, an electrification means, Two or more sets of toner image formation means which consist of an image write-in means, a development means, etc. are arranged. After imprinting collectively the superposition color toner image formed in photo conductor drum lifting on the medium imprint object of the shape of a belt once laid by two or more roller members, Form a superposition color toner image in photo conductor drum lifting again, and double the toner image of photo conductor drum lifting and the toner image on a medium imprint object, and timing, and it is fed. The toner image of photo conductor drum lifting is imprinted as a surface image to both sides of the imprint material conveyed with a medium imprint object, respectively. Moreover, after imprinting the toner image on a medium imprint object as a rear-face image, imprint material was separated from the medium imprint object, and image formation equipment and the image formation method which are established in the toner image on imprint material, and form a double-sided color picture were indicated in JP,9-258492,A or JP,9-258516,A.

[0006]

[Problem(s) to be Solved by the Invention] However, if the belt-like medium imprint object is left in above image formation equipment, without rotating at the time of non-image formation (at the time of a halt), even if it performs a preliminary revolution of a medium imprint object at the time of image formation The deflection peculiarity of a belt arises on the medium imprint object which is not canceled only by preliminary revolution, and the problem that the turbulence and the poor imprint of a toner image by the revolution unevenness of the imprint omission of the toner image at the time of an imprint or a medium imprint object occur by the deflection peculiarity of a belt-like medium imprint object arises.

[0007] It sets it as the 1st object for this invention to solve the above-mentioned trouble, to correct the deflection peculiarity of the medium imprint object of the shape of a belt at the time of a halt which is not canceled only by preliminary revolution, and to offer the image-formation equipment which prevents the turbulence and the poor imprint of a toner image by the revolution unevenness of the imprint omission of the toner image generated by the deflection peculiarity of a medium imprint object, or a medium imprint object.

[0008] Moreover, if the time amount to a print is long also after a power supply on, the deflection peculiarity of a belt will arise on a medium imprint object, and the problem that the turbulence and the poor imprint of a toner image by the revolution unevenness of the imprint omission of the toner image at the time of an imprint or a medium imprint object occur by the deflection peculiarity of a belt-like medium imprint object will arise.

[0009] It sets it as the 2nd object for this invention to solve the above-mentioned trouble, to correct the deflection peculiarity of the medium imprint object of the shape of a belt produced also with a power supply on when the waiting state time amount to a print is long, and to offer the image-formation equipment which prevents the turbulence and the poor imprint of a toner image by

the revolution unevenness of the imprint omission of the toner image generated by the deflection peculiarity of a medium imprint object, or a medium imprint object.

[0010] Moreover, although it is inquiring so that invention-in-this-application persons may prepare the belt approach stop member which engages with a roller member edge in the both ends of a belt-like medium imprint object in above image formation equipment and the approach of a belt-like medium imprint object may be prevented A belt approach stop member is ground with a roller member by the long-term activity of a medium imprint object, and it is deleted. It can delete, \*\*\*\* adheres to a belt-like medium imprint object rear face, it is inserted between roller members, and the problem that lowering of the life of the medium imprint object twisted for the ability producing a poor imprint at the time of an imprint, or deleting [ forming irregularity in a medium imprint object, ] arises arises.

[0011] While this invention solves the above-mentioned trouble and preventing the approach of a belt-like medium imprint object by the belt approach stop member Prevent and delete \*\*\*\* of a belt approach stop member, and \*\*\*\* should adhere to a belt-like medium imprint object rear face, and be caught between roller members. It sets it as the 3rd object to offer the image formation equipment which prevents lowering of the life of the poor imprint generated by forming irregularity in a medium imprint object, and the medium imprint object twisted for the ability deleting.

[0012] Moreover, although it is inquiring so that invention-in-this-application persons may prepare similarly the belt approach stop member which engages with a roller member edge in the both ends of a belt-like medium imprint object in above image formation equipment and the approach of a belt-like medium imprint object may be prevented If a belt-like medium imprint object approaches a roller member side, it will fall, if a medium imprint object runs aground on the roller member edge upper surface, and a drop sound called a van will happen between a medium imprint object and a roller member. This medium imprint object runs aground and the problem that the poor imprint at the time of turbulence and an imprint of the toner image on the medium imprint object by the actuation unevenness of actuation unevenness student \*\* of a medium imprint object and a medium imprint object occurs in the case of - drop arises.

[0013] While this invention solves the above-mentioned trouble and preventing the approach of a belt-like medium imprint object by the belt approach stop member, it sets it as the 4th object to offer the image-formation equipment which prevents the poor imprint at the time of turbulence and an imprint of the toner image on the medium imprint object to the roller member of a belt approach stop member which runs aground, prevents - drop, runs aground, and is generated according to the actuation unevenness of the medium imprint object at the time of - drop.

[0014]

[Means for Solving the Problem] The 1st object of the above is image-formation equipment (the 1st invention) characterized by to maintain the portion whose medium imprint object location at the time of a halt is a roller member contact location in an image support contact location by the print condition in the image-formation equipment which imprints the toner image formed of image support to both sides of imprint material through the medium imprint object of the shape of a belt laid by two or more roller members. And it is attained by the image-formation equipment (the 2nd invention) characterized by to maintain the portion whose medium imprint object location at the time of a halt is an image support contact location in a roller member contact location by the print condition in the image-formation equipment which imprints the toner image formed of image support to both sides of imprint material through the medium imprint object of the shape of a belt laid by two or more roller members.

[0015] Moreover, the 2nd object of the above is image formation equipment (3rd invention) characterized by changing a roller member contact location intermittently in the waiting state in image formation equipment which imprints a toner image formed of image support to both sides of imprint material through a medium imprint object of the shape of a belt laid by two or more roller members. And in image formation equipment which imprints a toner image formed of image support to both sides of imprint material through a medium imprint object of the shape of a belt laid by two or more roller members, it is attained in the waiting state by image formation equipment (4th invention) characterized by changing an image support contact location intermittently.

[0016] Moreover, the 3rd object of the above is set to image formation equipment which imprints a toner image formed of image support to both sides of imprint material through a medium imprint object of the shape of a belt laid by two or more roller members. While preparing a belt approach stop member in both ends of said medium imprint object, a curved surface is established in the roller angle-of-rotation-of-member section which receives said belt approach stop member. Image formation equipment characterized by setting thickness of said belt approach stop member to  $t/5 \leq r \leq t/3$  when setting a radius of a curved surface of  $t$  (mm) and said roller angle-of-rotation-of-member section to  $r$  (mm) (5th invention). And it sets to image formation equipment which imprints a toner image formed of image support to both sides of imprint material through a medium imprint object of the shape of a belt laid by two or more roller members. While preparing a belt approach stop member in both ends of said medium imprint object, a rotation member which receives said belt approach stop member is prepared in a both-sides edge of said roller member. It is attained by image formation equipment (6th invention) characterized by setting an overall diameter of the contact surface with the side of said rotation member and said roller member to  $<(R1/R2) 1/2$  when setting an overall diameter of the firm-bridging section of said medium imprint object of  $R1$  (mm) and said roller member to  $R2$  (mm).

[0017] Moreover, the 4th object of the above is set to image formation equipment which imprints a toner image formed of image support to both sides of imprint material through a medium imprint object of the shape of a belt laid by two or more roller members. While preparing a belt approach stop member in both ends of said medium imprint object, said roller member at least to any one both ends Image formation equipment characterized by preparing a guide member which counters with said belt approach stop member on both sides of said medium imprint object, and guides an edge of said medium imprint object (7th invention). And it sets to image formation equipment which imprints a toner image formed of image support to both sides of

imprint material through a medium imprint object of the shape of a belt laid by two or more roller members. While preparing a belt approach stop member in both ends of said medium imprint object, said roller member at least to any one both ends It is attained by image formation equipment (8th invention) characterized by preparing a press member which counters with said belt approach stop member, and presses an edge front face of said medium imprint object.

[0018]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained. In addition, the publication of this column limits neither the technical range of a claim, nor a terminological meaning. Moreover, the affirmative explanation in the gestalt of the following operations of this invention does not show the best mode, and does not limit a terminological meaning or the terminological technical range of this invention. In addition, in explanation of the following operation gestalten, the field of the imprint material of the side which counters a front face and the field of another side of imprint material, i.e., a medium imprint object, in the field of the imprint material of the side which counters image support in an imprint region is called rear face, and the image imprinted by the rear face of a surface image and imprint material in the image imprinted by the front face of imprint material is called rear-face image.

[0019] The image formation process of 1 operation gestalt of the image formation equipment common to each claim of this invention and each device are explained using drawing 1 thru/or drawing 3. Drawing 1 is the cross-section block diagram of the color picture formation equipment in which 1 operation gestalt of the image formation equipment common to each claim of this invention is shown. Drawing 2 It is the sectional side elevation of the image support of drawing 1, and drawing 3 is drawing showing the toner image formation condition in the image formation equipment common to each claim of this invention. Drawing 3 (A) It is drawing showing the toner image formation condition when imprinting the rear-face image formed in image support on a medium imprint object, and drawing 3 (B) is drawing showing the toner image formation condition when forming a surface image in image support synchronizing with the rear-face image on a medium imprint object.

[0020] The photo conductor drum whose 10 is image support in drawing 1, the scorotron electrification machine whose 11 is an electrification means for every color, The exposure optical system whose 12 is an image write-in means for every color, the development counter whose 13 is a development means for every color, The imprint machine which is a means to imprint the toner image on the medium imprint belt whose 14a is a medium imprint object, a means by which 14c imprints the toner image on image support on a medium imprint object, and image support, on the front face of imprint material, The rear-face imprint machine which is a means to imprint 14g of toner images on a medium imprint object at the rear face of imprint material, The electric discharge machine whose 14m is an electric discharge means, the paper electrification machine whose 150 is an imprint material electrification means, the paper separation AC electric discharge machine whose 14h is an imprint material separation means, the conveyance section which has the separation pawl 210 whose 160 is claw part material, and the spur 162 which is a spur member, and 17 are anchorage devices which are fixation means.

[0021] The photo conductor drum 10 which is image support forms sensitization layers, such as a conductive layer of transparence, an a-Si layer, or an organic sensitization layer (OPC), in the periphery of the base of the shape of a cylinder formed of transparence members, such as optical glass and transparence acrylic resin, and rotates with the linear velocity of 80 - 400 mm/sec to the clockwise rotation shown by the arrow head of drawing 1 where a conductive layer is grounded.

[0022] The bearing of the photo conductor drum 10 is carried out by the bearing B1 inserted in the flange material 10A and 10B of the both ends which carry out engagement immobilization of it as shown in drawing 2, and B-2 to the main part of equipment to the drum shaft 30 by which erection immobilization is carried out, and it is supported free [ a revolution ], and when the gearing G which considers as one of flange material 10B meshes with the driver which is not illustrated by the side of the main part of equipment and drives, it rotates by fixed speed in the predetermined direction.

[0023] A means to form a toner image on image support consists of a development counter 13 which is the exposure optical system 12 and the development means which are the scorotron electrification machine 11 and the image write-in means which are an electrification means, and these are made into 1 set. 4 sets is prepared as yellow (Y), a Magenta (M), cyanogen (C), and an object for the image formation processes of each black (K) color, and it is arranged in order of Y, M, C, and K to the hand of cut of the photo conductor drum 10 shown by the arrow head of drawing 1.

[0024] The scorotron electrification machine 11 which is an electrification means for every color has discharge electrode 11a which consists of for example, a control grid held at predetermined potential, respectively, and a serrate electrode, stands face to face against the sensitization layer of the photo conductor drum 10, by the corona discharge of a mounting eclipse, a toner, and like-pole nature, performs the electrization (it sets in this operation gestalt and is minus electrification), and gives uniform potential to the photo conductor drum 10. As discharge electrode 11a, it is also possible to, use a wire electrode and a needlelike electrode in addition to this.

[0025] The exposure optical system 12 which is an image write-in means for every color is arranged inside the photo conductor drum 10, as the exposure location on the photo conductor drum 10 is located in the hand-of-cut downstream of the photo conductor drum 10 to the scorotron electrification machine 11 for every color mentioned above. As shown in drawing 2, each exposure optical system 12 Linear exposure element 12a which arranged two or more LED (light emitting diode) as the drum shaft 30 and a light emitting device of the image exposure light (image write-in light) arranged by parallel in the main scanning direction in the shape of an array, It is the unit for exposure which consists of optical focusing nature optical transmission object (trade name: selfoc-lens array) 12b and lens-holder 12c as an image formation element, and is attached in an attachment component 20. 12d of imprint simultaneous photographic filters and uniform photographic filter 12e other than the exposure optical system 12 for every color are attached in an attachment component 20, and it holds in the interior of the base of the

translucency of the photo conductor drum 10 in one. The exposure optical system 12 for every color carries out the image store of the sensitization layer of the photo conductor drum 10 from a rear face according to the image data of each color which was read by the image reader of another object and was memorized by memory, and forms an electrostatic latent image on the photo conductor drum 10. It is also possible to use what arranged two or more light emitting devices, such as floor line (fluorescent substance luminescence), EL (electroluminescence), PL (plasma discharge), etc. besides LED, in the shape of an array as exposure element 12a. Although the thing of the penetrable high range of 780-900nm is usually used to the toner of Y, M, and C, since the luminescence wavelength of the light emitting device of image exposure light (image write-in light) is a method which performs an image store from a rear face in this operation gestalt, 400-780nm in wavelength shorter than this which does not fully have permeability to a color toner of it is sufficient. Moreover, since 80% or more of image exposure light is absorbed in the sensitization layer of the photo conductor drum 10, the effect of the echo and absorption by the color toner of photo conductor drum 10 front face can disregard it. Generally the order of development of a color toner has the desirable order of Y, M, C, and K from the relation of the color mixture to a toner image or a development counter 13. In addition, in drawing 2, WA is the lead wire from the light emitting device (LED) of image exposure light.

[0026] The development counter 13 which is a development means for every color maintains a predetermined gap to the peripheral surface of the photo conductor drum 10. The development sleeve 131 formed by the stainless steel nonmagnetic for example, or the aluminum material nonmagnetic for example, of the shape of a cylinder with a thickness [ of 0.5-1mm ], and an outer diameter of 15-25mm which rotates to the hand of cut and the forward direction of the photo conductor drum 10, It had the development casing 138 and one component or two component developer of yellow (Y), a Magenta (M), cyanogen (C), and black (K) is respectively held in the interior of the development casing 138. Un-illustrating dashes each development counter 13, it opens the photo conductor drum 10 and a predetermined gap, for example, 100-500 micrometers, by the koro, is maintained at non-contact, by impressing the development bias which superimposed direct current voltage and alternating voltage to the development sleeve 131, performs non-contact reversal development and forms a toner image on the photo conductor drum 10.

[0027] A volume resistivity is the endless belt of 109 - 1012 ohm-cm preferably 108 to 1016 ohm-cm, for example, medium imprint belt 14a which is a medium imprint object is the seamless belt of the two-layer configuration which performed fluorine coating with a thickness of 5-50 micrometers on the outside of a half-conductivity film base with a thickness of 0.1-1.0mm which distributed the electrical conducting material to engineering plastics, such as denaturation polyimide, heat-curing polyimide, an ethylene tetrafluoroethylene copolymer, polyvinylidene fluoride, and a nylon alloy, as a toner filming prevention layer preferably. If it considers as the base of medium imprint belt 14a, a half-conductivity rubber belt with a thickness of 0.5-2.0mm which distributed the electrical conducting material can also be used for silicone rubber or polyurethane rubber. Medium imprint belt 14a is laid [ firmly ] across 14d of driving rollers and ground roller 14j which are a roller member, respectively, follower roller 14e, guide-idler 14f, and tension roller 14i, and rotates to the counterclockwise rotation shown by the arrow head of drawing 1. It fixes and rotates, and tension roller 14i is supported by elasticity, such as a non-illustrated spring, movable, and rotates guide-idler 14f and follower roller 14e, ground roller 14j, and 14d of driving rollers. 14d of driving rollers rotates in response to actuation [ drive motor / non-illustrated ], and medium imprint belt 14a is driven and it is made to rotate. Ground roller 14j, follower roller 14e, and guide-idler 14f and tension roller 14i follow by the revolution of medium imprint belt 14a, and it rotates. The belt slack of medium imprint belt 14a under revolution becomes it tense by tension roller 14i. The recording paper P which is imprint material is supplied to the location where medium imprint belt 14a is laid [ firmly ] across follower roller 14e, and it is conveyed by medium imprint belt 14a. In the curvature section KT of the edge by the side of the anchorage device 17 of medium imprint belt 14a laid by 14d of driving rollers, the recording paper P is separated from medium imprint belt 14a.

[0028] Imprint machine 14c as a means to imprint the toner image on a means to imprint the toner image on image support on a medium imprint object, and image support, on the front face of imprint material is a corona discharge machine which counters the photo conductor drum 10 and is formed on both sides of medium imprint belt 14a, and forms imprint region 14b between medium imprint belt 14a and the photo conductor drum 10. The direct current voltage of a toner and antipole nature (it sets in this operation gestalt and is plus polarity) is impressed to imprint machine 14c, and the toner image on the photo conductor drum 10 is imprinted on the front face of the recording paper P which is a medium imprint belt 14a top or imprint material.

[0029] 14g of rear-face imprint machines which are a means to imprint the toner image on a medium imprint object at the rear face of imprint material is preferably constituted by the corona discharge machine. On both sides of medium imprint belt 14a, it is prepared in imprint machine 14c and ground roller 14j prepared between 14d of driving rollers face to face. The direct current voltage of a toner and antipole nature (it sets in this operation gestalt and is plus polarity) is impressed, and the toner image on medium imprint belt 14a is imprinted at the rear face of the recording paper P.

[0030] It is constituted by the corona discharge machine, and to the migration direction of medium imprint belt 14a, it stands in a row in the downstream of imprint machine 14c with imprint machine 14c, and is prepared in it, alternating voltage is impressed, and 14m of electric discharge machines which are an electric discharge means discharges the charge of medium imprint belt 14a in which electrification is carried out by voltage impression of imprint machine 14c.

[0031] It is preferably constituted by the serrate electrode, and it counters with follower roller 14e grounded on both sides of medium imprint belt 14a, and is prepared, and the direct current voltage of a toner and like-pole nature (it sets in this operation gestalt and is minus polarity) is impressed, the paper electrification machine 150 which is an imprint material electrification means is charged, and medium imprint belt 14a is made to adsorb the recording paper P in it. It is also possible to use the paper electrification brush in which the contact and contact discharge to a corona discharge machine or medium imprint belt 14a other than a serrate electrode are possible, a paper electrification roller, etc. as a paper electrification machine 150.



[0032] 14h of paper separation AC electric discharge machines which are an imprint material separation means is preferably constituted by the corona discharge machine. Counter 14d of driving rollers grounded by the anchorage device 17 side-edge section of medium imprint belt 14a on both sides of medium imprint belt 14a, are prepared, and so that it may mention later The alternating voltage which superimposed the direct current voltage impressed to 14g of rear-face imprint machines and the direct current voltage of like-pole nature (it sets in this operation gestalt and is plus polarity) is impressed, the recording paper P conveyed by medium imprint belt 14a is discharged, and it dissociates from medium imprint belt 14a.

[0033] The conveyance section 160 has the separation pawl 210 which is claw part material, and the spur 162 which is a spur member, and is prepared between the curvature section KT of the edge by the side of the anchorage device 17 of medium imprint belt 14a, and an anchorage device 17. The conveyance section 160 prevents that, and become or a toner fixes on medium imprint belt 14a with the heat from an anchorage device 17 that the toner image supported by medium imprint belt 14a becomes with some welding, and it is hard to imprint. [ that medium imprint belt 14a deforms ]

[0034] The separation pawl 210 which is claw part material approaches the curvature section KT of medium imprint belt 14a. Vacate 0.1-2.0mm preferably, and it is fixed to the support shaft 221, and is prepared. medium imprint belt 14a and a predetermined gap -- In case the recording paper P is separated from medium imprint belt 14a, the point of the recording paper P which is going to be conveyed by bending in the direction of medium imprint belt 14a is made to contact, and separation of the recording paper P is assisted.

[0035] The spur 162 which is a spur member has two or more height 162a in a peripheral surface, and is prepared free [ a revolution ] centering on the revolution support shaft 165. A spur 162 guides the rear-face side of the recording paper P, conveys the recording paper P, fixing the penetration direction to the anchorage device 17 of the recording paper P, is stabilized and conveys the recording paper P to an anchorage device 17 while it prevents turbulence of the rear-face toner image of the recording paper P which has a toner image to both sides.

[0036] The separation pawl 210 and a spur 162 are arranged in the opposite hand of the photo conductor drum 10 to the imprint material conveyance side or its extended field on medium imprint belt 14a. It is also possible to form the spur 162 which is a spur member in an imprint material conveyance side or the both sides of the extended field.

[0037] The anchorage device 17 which is a fixation means is established in the toner image on the recording paper P which has the nip section T conveyed by consisting of fixation members of the two shape of a roller of 1st fixing roller 17a and 2nd fixing roller 17b which have a heater inside, carrying out pinching conveyance of the recording paper P in the nip section T between 1st fixing roller 17a and 2nd fixing roller 17b, and adding heat and a pressure.

[0038] Next, an image formation process is explained.

[0039] It rotates to the clockwise rotation which the photo conductor drum 10 shows by the arrow head of drawing 1 by start up of the photo conductor drive motor which is not illustrated by the start of image recording, and grant of potential is simultaneously started by the photo conductor drum 10 by the electrization of the scorotron electrification machine 11 of yellow (Y).

[0040] After potential is given to the photo conductor drum 10, the image store by the 1st chrominance signal, i.e., the electrical signal corresponding to the image data of Y, is started by the exposure optical system 12 of Y, and the electrostatic latent image corresponding to the image of Y of a manuscript image is formed in the front face of the photo conductor drum 10.

[0041] Reversal development of the aforementioned latent image is carried out in the non-contact condition by the development counter 13 of Y, and the toner image of yellow (Y) is formed on the photo conductor drum 10.

[0042] Subsequently, as for the photo conductor drum 10, potential is given by the electrization of the scorotron electrification machine 11 of a Magenta (M) from on the toner image of Y. The image store by the 2nd chrominance signal, i.e., the electrical signal corresponding to the image data of M, is performed by the exposure optical system 12 of M, and the toner image of a Magenta (M) is piled up and formed on the toner image of the aforementioned yellow (Y) of the non-contact reversal development by the development counter 13 of M.

[0043] Of the same process, by the scorotron electrification machine 11 of cyanogen (C), the exposure optical system 12 of C, and the development counter 13 of C, further, the toner image of the cyanogen (C) corresponding to the 3rd chrominance signal piles up, and is formed. Furthermore, on it, by the black (K) scorotron electrification machine 11, the exposure optical system 12 of K, and the development counter 13 of K, the toner image of the black (K) corresponding to the 4th chrominance signal makes it pile each other up one by one, and is formed. Yellow (Y), a Magenta (M), cyanogen (C), and the superposition color toner image of four black (K) colors are formed on the peripheral surface within one revolution of the photo conductor drum 10.

[0044] The image store to the sensitization layer of the photo conductor drum 10 by the exposure optical system 12 of these Y, M, C, and K is performed through the base of the translucency mentioned above from the interior of a drum. Therefore, each store of the image corresponding to the 2nd, 3rd, and 4th chrominance signals is performed without completely being influenced of the toner image formed previously, and it becomes possible to form an electrostatic latent image equivalent to the image corresponding to the 1st chrominance signal.

[0045] The superposition color toner image used as the rear-face image formed on the photo conductor drum 10 which is image support is collectively imprinted by the above-mentioned image formation process by imprint machine 14c in imprint region 14b on medium imprint belt 14a which is a medium imprint object ( drawing 3 (A)). Under the present circumstances, the uniform exposure by 12d of imprint simultaneous photographic filters prepared in the interior of the photo conductor drum 10 may be made to be performed so that a good imprint may be made. Moreover, the charge of medium imprint belt 14a in which electrification was carried out by imprint machine 14c is discharged with 14vessels of electric discharge machines.

[0046] The toner which remained on the peripheral surface of the photo conductor drum 10 after an imprint results electric

discharge in the cleaning equipment 19 which is an image support cleaning means after a carrier beam with the photo conductor drum AC electric discharge vessel 16, is cleaned by cleaning-blade 19a which consists of the rubber material which contacted the photo conductor drum 10, and are collected by the non-illustrated \*\* toner bottle by screw 19b. Moreover, as for the peripheral surface of the photo conductor drum 10, the hysteresis of the photo conductor drum 10 in previous image formation is canceled by exposure by uniform photographic filter 12e before electrification using light emitting diode.

[0047] After the superposition color toner image which turns into a rear-face image on medium imprint belt 14a as mentioned above is formed, on the photo conductor drum 10, the superposition color toner image which turns into a surface image succeeding is formed like the above-mentioned color picture formation process ( drawing 3 (B) ). Under the present circumstances, image data is changed so that the surface image formed on the photo conductor drum 10 may turn into a mirror image to the rear-face image formed on said photo conductor drum 10.

[0048] In connection with the surface image formation to the photo conductor drum 10 top, from the sheet paper cassette 15 whose recording paper P which is imprint material is an imprint material receipt means It is sent out by send roller 15a and conveyed to timing roller 15b as an imprint material feed means. By actuation of timing roller 15b The synchronization with the color toner image of the surface image formed on the photo conductor drum 10 and the color toner image of the rear-face image currently supported by medium imprint belt 14a is taken, and imprint region 14b is fed. Under the present circumstances, it is charged to a toner and like-pole nature with the paper electrification vessel 150 which is the imprint material electrification means formed in the front-face side of the recording paper P, medium imprint belt 14a is adsorbed, and the recording paper P with which it is fed is conveyed to imprint region 14b. By performing paper electrification to a toner and like-pole nature, it prevented paying well with the toner image on the toner image and the photo conductor drum 10 on medium imprint belt 14a, and turbulence of a toner image is prevented.

[0049] In imprint region 14b, the surface image on the photo conductor drum 10 bundles up, and imprint machine 14c to which the voltage of a toner and antipole nature (it sets in this operation gestalt and is plus polarity) is impressed imprints on the front face of the recording paper P. At this time, the rear-face image on medium imprint belt 14a exists on medium imprint belt 14a without the recording paper's P imprinting. Under the present circumstances, it countered with imprint region 14b, and was prepared in the interior of the photo conductor drum 10, for example, the uniform exposure by 12d of imprint simultaneous photographic filters using light emitting diode may be made to be performed so that a good imprint may be made. Moreover, the charge of medium imprint belt 14a in which electrification was carried out by imprint machine 14c is discharged with 14vessels of electric discharge machines.

[0050] The recording paper P with which the color toner image was imprinted by the front face is conveyed at a toner and 14g of rear-face imprint machines with which the voltage of antipole nature (it sets in this operation gestalt and is plus polarity) is impressed, and the rear-face image on the peripheral surface of medium imprint belt 14a bundles it up with 14vessels of rear-face imprint machines, and it is imprinted by the rear face of the recording paper P ( drawing 3 (C) ).

[0051] The recording paper P with which the color toner image was formed in both sides The curvature of the curvature section KT of medium imprint belt 14a, and the electric discharge operation with 14h of paper separation AC electric discharge machines as an imprint material separation means formed in the edge of medium imprint belt 14a, With the separation pawl 210 which vacates medium imprint belt 14a and a predetermined gap, and is formed in the conveyance section 160 Dissociate from medium imprint belt 14a, and it is conveyed through the spur 162 prepared in the conveyance section 160 to the anchorage device 17 as a fixation means. It is fixed to the toner image on the recording paper P by conveying between the nip sections T between 1st fixing roller 17a and 2nd fixing roller 17b, and being able to add heat and a pressure in the nip section T. The recording paper P with which double-sided image recording was made has the front reverse side reversed, is sent, and is discharged with the delivery roller 18 to the tray of the equipment exterior.

[0052] On both sides of medium imprint belt 14a, the toner which remained on the peripheral surface of medium imprint belt 14a after an imprint counters guide-idler 14f, is prepared, and is cleaned by the medium imprint object cleaning equipment 250 which is a medium imprint object cleaning means have the medium imprint object cleaning blade 251 in which contact and contact discharge are possible in medium imprint belt 14a by using a pivot 252 as the revolution supporting point.

[0053] Moreover, cleaning equipment 19 cleans electric discharge after a carrier beam with the photo conductor drum AC electric discharge vessel 16, the hysteresis of the photo conductor drum 10 in previous image formation is canceled by uniform photographic filter 12e before electrification, and the toner which remained on the peripheral surface of the photo conductor drum 10 after an imprint is in the following image formation cycle.

[0054] Since the package imprint of the superposition color toner image is carried out by using the above-mentioned method, color gap of the color picture on medium imprint belt 14a and a toner break up, \*\*\*\*\* etc. cannot happen easily, and the good double-sided color picture formation with little image deterioration is made.

[0055] If it is left in the image formation equipment explained by drawing 1 of the operation gestalt 1 above, without rotating medium imprint belt 14a which is a medium imprint object at the time of non-image formation (at the time of a halt) Even if it performs the preliminary revolution of medium imprint belt 14a by the print ready state of an anchorage device 17 in advance of the time of image formation The deflection peculiarity of the belt at the time of a halt which is not canceled only by preliminary revolution arises in medium imprint belt 14a. The deflection peculiarity in 14d location of driving rollers and photo conductor drum 10 location which are one of the roller members by which medium imprint belt 14a is bent by especially the acute angle arises. By the deflection peculiarity of medium imprint belt 14a The imprint omission of the toner image in the time of the imprint of the rear-face toner image from the photo conductor drum 10 to medium imprint belt 14a, the imprint to the recording paper P

of the surface toner image on the photo conductor drum 10, and the imprint to the recording paper P of the rear-face toner image on medium imprint belt 14a etc., Turbulence and a poor imprint of a toner image occur according to the revolution unevenness of medium imprint belt 14a in each roller member location by the irregularity of the deflection peculiarity of medium imprint belt 14a.

[0056] The correction method of claim 1 of this invention for solving the above-mentioned trouble thru/or the deflection peculiarity of the medium imprint object in connection with 3 is explained using drawing 4 thru/or drawing 7. Drawing 4 is explanatory drawing of the correction method of the deflection peculiarity in the roller member contact location of the medium imprint object in connection with claims 1 or 3, drawing 5 is important section amplification explanatory drawing of drawing 4, drawing 6 is explanatory drawing of the correction method of the deflection peculiarity in the image support contact location of the medium imprint object in connection with claims 2 or 3, and drawing 7 is important section amplification explanatory drawing of drawing 6. In addition, as the correction method of the deflection peculiarity in the roller member contact location of the following, although most remarkable 14d location of driving rollers of a deflection peculiarity is explained as an example, it is applied also to correction of the deflection peculiarity by roller members, such as other ground roller 14j, follower roller 14e, and guide-idler 14f and tension roller 14i.

[0057] According to drawing 4 or drawing 5, medium imprint belt 14a which is a medium imprint object is set at the time of a halt. Since it is maintained where it was laid [ firmly ] across 14d of driving rollers and ground roller 14j which are a roller member, respectively, follower roller 14e, guide-idler 14f, and tension roller 14i and the photo conductor drum 10 which is image support is contacted. The deflection peculiarity of medium imprint belt 14a is produced in the 14d [ of driving rollers as a roller member ] roller member contact location P2. In order to correct this deflection peculiarity, the medium imprint object location at the time of a halt rotates the portion which is the 14d [ of driving rollers ] roller member contact location P2 into image support contact location P1 portion with the photo conductor drum 10, and moves, and it maintains by a print ready's condition which can be printed in the image support contact location P1 with the photo conductor drum 10. It is desirable to maintain continuously in the image support contact location P1 with the photo conductor drum 10 until it becomes a print ready. Thereby, as shown in drawing 5, the deflection peculiarity portion formed in the front-face side by 14d of driving rollers in the roller member contact location P2 convex is maintained with convex to a rear-face side in image support contact location P1 portion which contacts the photo conductor drum 10, and a convex deflection peculiarity is corrected to a front-face side.

[0058] The deflection peculiarity in the roller member contact location of the medium imprint object of the shape of a belt at the time of a halt which is not canceled only by preliminary revolution is corrected by the above. The imprint omission of the toner image in the time of the imprint of the rear-face toner image from the image support generated by the deflection peculiarity of a medium imprint object to a medium imprint object, the imprint to the imprint material of the surface toner image on image support, and the imprint to the imprint material of the rear-face toner image on a medium imprint object etc., The poor imprint at the time of turbulence and an imprint of the toner image on the medium imprint object by the revolution unevenness of the medium imprint object in each roller member location by the irregularity of the deflection peculiarity of a medium imprint object is prevented.

[0059] Since according to drawing 6 or drawing 7 medium imprint belt 14a which is a medium imprint object is maintained at the time of a halt where it was laid [ firmly ] across 14d of driving rollers and ground roller 14j which are a roller member, respectively, follower roller 14e, guide-idler 14f, and tension roller 14i and the photo conductor drum 10 which is image support is contacted, the deflection peculiarity of medium imprint belt 14a is produced in the image support contact location P1 with the photo conductor drum 10 which is image support. In order to correct this deflection peculiarity, the medium imprint object location at the time of a halt rotates the portion which is the image support contact location P1 with the photo conductor drum 10 into roller member contact location P2 14d [ of driving rollers as a roller member ] portion, and moves, and it maintains by a print ready's condition which can be printed in the 14d [ of driving rollers ] roller member contact location P2. It is desirable to maintain continuously in the 14d [ of driving rollers ] roller member contact location P2 until it becomes a print ready. Thereby, as shown in drawing 7, the deflection peculiarity portion formed in the rear-face side on the photo conductor drum 10 in the image support contact location P1 convex is maintained with convex to a front-face side in roller member contact location P2 portion which contacts 14d of driving rollers, and a convex deflection peculiarity is corrected to a rear-face side.

[0060] The deflection peculiarity in the image support contact location of the medium imprint object of the shape of a belt at the time of a halt which is not canceled only by preliminary revolution is corrected by the above. The imprint omission of the toner image in the time of the imprint of the rear-face toner image from the image support generated by the deflection peculiarity of a medium imprint object to a medium imprint object, the imprint to the imprint material of the surface toner image on image support, and the imprint to the imprint material of the rear-face toner image on a medium imprint object etc., The poor imprint at the time of turbulence and an imprint of the toner image on the medium imprint object by the revolution unevenness of the medium imprint object in each roller member location by the irregularity of the deflection peculiarity of a medium imprint object is prevented.

[0061] Furthermore above-mentioned drawing 4 and drawing 6 explained. In order to correct the both sides of the deflection peculiarity of medium imprint belt 14a produced in the image support contact location P1 with the photo conductor drum 10 which is the deflection peculiarity and image support of medium imprint belt 14a which are produced in the 14d [ of driving rollers as a roller member ] roller member contact location P2, The medium imprint object location at the time of a halt rotates the portion which is the 14d [ of driving rollers ] roller member contact location P2 into image support contact location P1 portion with the photo conductor drum 10, and moves, and it maintains in the image support contact location P1 with the photo conductor

drum 10, The portion whose medium imprint object location at the time of a halt is the image support contact location P1 with the photo conductor drum 10 It is desirable to repeat by the print condition to rotate and move to roller member contact location P2 14d [ of driving rollers as a roller member ] portion, and to maintain in the 14d [ of driving rollers ] roller member contact location P2 and that a print is performed (invention in connection with claim 3).

[0062] The deflection peculiarity in the roller member contact location of the medium imprint object of the shape of a belt at the time of a halt which is not canceled only by preliminary revolution and the deflection peculiarity in an image support contact location are corrected by the above. The imprint omission of the toner image in the time of the imprint of the rear-face toner image from the image support generated by the deflection peculiarity of a medium imprint object to a medium imprint object, the imprint to the imprint material of the surface toner image on image support, and the imprint to the imprint material of the rear-face toner image on a medium imprint object etc., The poor imprint at the time of turbulence and an imprint of the toner image on the medium imprint object by the revolution unevenness of the medium imprint object in each roller member location by the irregularity of the deflection peculiarity of a medium imprint object is prevented.

[0063] In the image formation equipment explained by the operation gestalt 2 and said drawing 1 , also with a power supply on, if the time amount to a print is long The deflection peculiarity of a belt arises in medium imprint belt 14a, and the deflection peculiarity in 14d location of driving rollers and photo conductor drum 10 location which are one of the roller members by which medium imprint belt 14a is bent by especially the acute angle arises. By the deflection peculiarity of medium imprint belt 14a The imprint omission of the toner image in the time of the imprint of the rear-face toner image from the photo conductor drum 10 to medium imprint belt 14a, the imprint to the recording paper P of the surface toner image on the photo conductor drum 10, and the imprint to the recording paper P of the rear-face toner image on medium imprint belt 14a etc., Turbulence and a poor imprint of a toner image occur according to the revolution unevenness of medium imprint belt 14a in each roller member location by the irregularity of the deflection peculiarity of medium imprint belt 14a.

[0064] The correction method of the deflection peculiarity of the medium imprint object in connection with claims 4 or 5 of this invention for solving the above-mentioned trouble is explained using drawing 8 or drawing 9 . Drawing 8 is explanatory drawing of the correction method of the deflection peculiarity in the roller member contact location of the medium imprint object in connection with claim 4, and drawing 9 is explanatory drawing of the correction method of the deflection peculiarity in the image support contact location of the medium imprint object in connection with claim 5. In addition, as the correction method of the deflection peculiarity in the roller member contact location of the following, although most remarkable 14d location of driving rollers of a deflection peculiarity is explained as an example, it is applied also to correction of the deflection peculiarity by roller members, such as other ground roller 14j, follower roller 14e, and guide-idler 14f and tension roller 14i.

[0065] If medium imprint belt 14a which is a medium imprint object has the long waiting state time amount to a print also with a power supply on according to drawing 8 Since it is maintained where it was laid [ firmly ] across 14d of driving rollers and ground roller 14j which are a roller member, respectively, follower roller 14e, guide-idler 14f, and tension roller 14i and the photo conductor drum 10 which is image support is contacted The deflection peculiarity of medium imprint belt 14a is produced in the 14d [ of driving rollers as a roller member ] roller member contact location P2. In order to correct this deflection peculiarity, in the waiting state, a deflection peculiarity is corrected by changing the roller member contact location P2 into the flat-surface locations P21 and P22 intermittently, and lengthening medium imprint belt 14a in a flat-surface location.

[0066] The deflection peculiarity in the roller member contact location of the medium imprint object of the shape of a belt produced also with a power supply on when the waiting state time amount to a print is long is corrected by the above. The imprint omission of the toner image in the time of the imprint of the rear-face toner image from the image support generated by the deflection peculiarity of a medium imprint object to a medium imprint object, the imprint to the imprint material of the surface toner image on image support, and the imprint to the imprint material of the rear-face toner image on a medium imprint object etc., The poor imprint at the time of turbulence and an imprint of the toner image on the medium imprint object by the revolution unevenness of the medium imprint object in each roller member location by the irregularity of the deflection peculiarity of a medium imprint object is prevented.

[0067] If medium imprint belt 14a which is a medium imprint object has the long waiting state time amount to a print also with a power supply on according to drawing 9 Since it is maintained where it was laid [ firmly ] across 14d of driving rollers and ground roller 14j which are a roller member, respectively, follower roller 14e, guide-idler 14f, and tension roller 14i and the photo conductor drum 10 which is image support is contacted The deflection peculiarity of medium imprint belt 14a is produced in the image support contact location P1 with the photo conductor drum 10 which is image support. In order to correct this deflection peculiarity, in the waiting state, a deflection peculiarity is corrected by changing the image support contact location P1 into the flat-surface locations P11 and P12 intermittently, and lengthening medium imprint belt 14a in a flat-surface location.

[0068] The deflection peculiarity in the image support contact location of the medium imprint object of the shape of a belt produced also with a power supply on when the waiting state time amount to a print is long is corrected by the above. The imprint omission of the toner image in the time of the imprint of the rear-face toner image from the image support generated by the deflection peculiarity of a medium imprint object to a medium imprint object, the imprint to the imprint material of the surface toner image on image support, and the imprint to the imprint material of the rear-face toner image on a medium imprint object etc., The poor imprint at the time of turbulence and an imprint of the toner image on the medium imprint object by the revolution unevenness of the medium imprint object in each roller member location by the irregularity of the deflection peculiarity of a medium imprint object is prevented.

[0069] In the image formation equipment explained by the operation gestalt 3 and said drawing 1 , invention-in-this-application

persons to the both ends of medium imprint belt 14a which is a medium imprint object 14d of driving rollers, ground roller 14j which lay medium imprint belt 14a, Although it is inquiring so that the belt approach stop member which engages with the both ends of roller members, such as follower roller 14e and guide-idler 14f and tension roller 14i, may be prepared and the approach of medium imprint belt 14a may be prevented A belt approach stop member is ground with a roller member by the long-term activity of medium imprint belt 14a, and it is deleted. Delete, and \*\*\*\* should adhere to the rear face of medium imprint belt 14a, and be caught between roller members. Irregularity will be formed in medium imprint belt 14a, a poor imprint is produced at the time of the imprint of the rear-face toner image on medium imprint belt 14a performed in the upper part of ground roller 14j, or lowering of the life of medium imprint belt 14a depended for the ability deleting arises.

[0070] Claim 6 of this invention for solving the above-mentioned trouble thru/or the belt approach stop member in connection with 8 can be deleted, and the prevention method is explained using drawing 10 or drawing 11. Drawing 10 can delete the belt approach stop member in connection with claims 6 or 7, and is explanatory drawing of the prevention method, and drawing 11 can delete the belt approach stop member in connection with claim 8, and is explanatory drawing of the prevention method. In addition, although the following belt approach stop members can be deleted and 14d of driving rollers is explained as an example as a roller member in explanation of prevention, it is applied also to roller members, such as other ground roller 14j, follower roller 14e, and guide-idler 14f and tension roller 14i. Moreover, although only one 14d side of driving rollers as a roller member is shown, an another side side is also symmetrically constituted with this.

[0071] According to drawing 10, the belt approach prevention protruding line 141 which is a belt approach stop member using a rubber member is formed in the both ends of medium imprint belt 14a which is a medium imprint object. On the other hand, 14d of driving rollers as a roller member which lays medium imprint belt 14a consists of the axis of rotation 243 of ends, and the level difference section 242 of the ends of the main part section 241 of a roller which rotates the axis of rotation 243 as a center, and the main part section 241 of a roller, and where the belt approach prevention protruding line 141 is inserted in the level difference section 242, medium imprint belt 14a rotates them.

[0072] Although the corner (roller angle-of-rotation-of-member section) CN of the main part section 241 of a roller to which the belt approach prevention protruding line 141 contacts 14d of driving rollers conventionally was beveling (slanting cut) of 90 degrees or about 0.1-0.5mm, since the trouble out of which \*\*\*\* came and which could delete now, and it mentioned above arises, a curved surface is given to the roller angle-of-rotation-of-member section CN, and \*\*\*\* is prevented.

[0073] When setting the radius of the curved surface of t (mm) and the roller angle-of-rotation-of-member section CN to r (mm), thickness of the belt approach prevention protruding line 141 which is a belt approach stop member is set to  $t/5 \leq r \leq t/3$  so that \*\*\*\* of the belt approach prevention protruding line 141 in the roller angle-of-rotation-of-member section CN may decrease.

[0074] if the radius r of \*\*\*\* of the curved surface of the roller angle-of-rotation-of-member section CN increases less than [ of thickness t of the belt approach prevention protruding line 141 ] in  $1/5 (r < t/5)$  and the radius r of the curved surface of the roller angle-of-rotation-of-member section CN exceeds one third of thickness t of the belt approach prevention protruding line 141 ( $r > t/3$ ) -- \*\*\*\* -- running aground in the main part section 241 of a roller whose belt approach prevention protruding line 141 is 14d of driving rollers was checked experimentally. Furthermore, it is desirable to set to 0.8-1.5mm thickness t of the belt approach prevention protruding line 141 used in this case. By less than 0.8mm, if thickness t of the belt approach prevention protruding line 141 is too thin If the belt approach prevention protruding line 141 becomes easy to run in the main part section 241 of a roller aground and the belt approach prevention protruding line 141 is too thick exceeding 1.5mm The waist of medium imprint belt 14a becomes strong, the load of medium imprint belt 14a is applied at the time of 14d revolution of driving rollers, the revolution of 14d of driving rollers does not become uniform, or ends are stretched strongly, the center section of medium imprint belt 14a lenticulates, and a belt side is not maintained at homogeneity. moreover, the increase of resistance which joins the contact surface with main part section of roller 241 edge of the belt approach prevention protruding line 141 in the entrance section of the coiling-round section and the outlet section to the roller member of the belt approach prevention protruding line 141 and the belt approach prevention protruding line 141 -- the life of medium imprint belt 14a depended for the ability deleting becomes short.

[0075] while the approach of a belt-like medium imprint object is prevented by the belt approach stop member by the above -- the roller angle-of-rotation-of-member section of a belt approach stop member -- it grinds -- it is prevented by \*\*\*\* which boils and depends, it can delete, \*\*\*\* adheres to a belt-like medium imprint object rear face, and it is caught between roller members -- lowering of the life of the poor imprint which generates by being formed irregularity in a medium imprint object, and the medium imprint object which twist for the ability being able to delete is prevented.

[0076] Moreover, although that whose outer diameter is about 5-30mm as a roller member containing 14d of driving rollers is used, the revolution of 14d of driving rollers does not become uniform by fluctuation of the press by the approach of the belt approach prevention protruding line 141 which joins the contact surface in main part section of roller 241 edge of the belt approach prevention protruding line 141 in the entrance section of the coiling-round section and the outlet section to the roller member of the belt approach prevention protruding line 141. For this reason, like drawing 11, coefficient of friction constitutes the rotation roller 341 which is a rotation member by the resin member of small polyacetal with little wear, and inserts the rotation roller 341 in the both ends of 14d of driving rollers through the axis of rotation 243. In order to make a revolution of the rotation roller 341 good furthermore, the contact surface with the main part section 241 of a roller of the rotation roller 341 is lessened, and it is made for the rotation roller 341 to rotate with the main part section 241 of a roller as free as possible. For this reason, it is referred to as  $(R1/R2) 1/2$  when setting to R2 (mm) the overall diameter of the firm-bridging section of medium imprint belt 14a which is R1 (mm) and the medium imprint object of 14d of driving rollers about the overall diameter of the contact surface with

the side of the rotation roller 341 and 14d of driving rollers as a roller member which is a rotation member. Since the resistance added in the contact surface of the belt approach prevention protruding line 141 in the entrance section of the coiling-round section and the outlet section to the roller member of the belt approach prevention protruding line 141 does not join direct-drive roller 14d but it is weakened and added by this through the rotation roller 341 which rotates being used as a free condition, \*\*\*\* of the belt approach prevention protruding line 141 is reduced, and the life of medium imprint belt 14a improves. As for contact in the main part section 241 of a roller of the rotation roller 341, R1/R2 are too large at 1/2 or more, that 14d of driving rollers becomes free decreases, and semantic \*\*\*\* which forms the rotation roller 341 is lost.

[0077] While the approach of a belt-like medium imprint object is prevented by the belt approach stop member by the above \*\*\*\* of a belt approach stop member is prevented by few rotation members of resistance in the contact surface with a roller member. It can delete, \*\*\*\* adheres to a belt-like medium imprint object rear face, it is inserted between roller members, and lowering of the life of the poor imprint at the time of the imprint generated by forming irregularity in a medium imprint object and the medium imprint object twisted for the ability deleting is prevented.

[0078] In the image formation equipment explained by the operation gestalt 4 and said drawing 1, invention-in-this-application persons to the both ends of medium imprint belt 14a which is a medium imprint object 14d of driving rollers, ground roller 14j which lay medium imprint belt 14a, Although it is inquiring so that the belt approach stop member which engages with the both ends of roller members, such as follower roller 14e and guide-idler 14f and tension roller 14i, may be prepared and the approach of medium imprint belt 14a may be prevented If medium imprint belt 14a approaches a roller member side, it will fall, if medium imprint belt 14a runs aground on the roller member edge upper surface, and a drop sound called a van will happen between medium imprint belt 14a and a roller member. This medium imprint belt 14a runs aground, and the poor imprint at the time of turbulence and an imprint of the toner image on medium imprint belt 14a by the actuation unevenness of actuation unevenness student \*\* of medium imprint belt 14a and medium imprint belt 14a occurs in the case of - drop.

[0079] Claim 9 of this invention for solving the above-mentioned trouble thru/or the belt approach stop member in connection with 12 run aground, and the prevention method is explained using drawing 12 thru/or drawing 15. It is explanatory drawing with desirable arrangement of the guide member in connection with arrangement of the guide member of drawing 12, and claim 10 in drawing 13, and the belt approach stop member by the guide member in connection with claim 9 in drawing 12 runs aground, it is explanatory drawing of the prevention method, and drawing 15 is [ the belt approach stop member by the press member in connection with claim 11 in drawing 14 runs aground, it is explanatory drawing of the prevention method, and ] explanatory drawing of arrangement of the press member of drawing 14, and desirable arrangement of the press member in connection with claim 12. In addition, although the following belt approach stop members run aground and 14d of driving rollers is explained as an example as a roller member in drawing 12 or drawing 14 in explanation of prevention, it is applied also to roller members of others except tension roller 14i, such as ground roller 14j, follower roller 14e, and guide-idler 14f.

[0080] According to drawing 12 or drawing 13, medium imprint belt 14a which is a medium imprint object is laid [ firmly ] across 14d of driving rollers, ground roller 14j, follower roller 14e, guide-idler 14f, and tension roller 14i. The belt approach prevention protruding line 141 which is a belt approach stop member using a rubber member is formed in the both ends of medium imprint belt 14a. On the other hand, 14d of driving rollers as a roller member except tension roller 14i which lays medium imprint belt 14a, ground roller 14j, follower roller 14e, and guide-idler 14f It consists of the axis of rotation 243 of ends, and the level difference section 242 of the ends of the main part section 241 of a roller which rotates the axis of rotation 243 as a center, and the main part section 241 of a roller. A bearing B3 is inserted in the axis of rotation 243 of roller member both ends, the bearing case 71 of the both ends which contain a bearing B3 is attached in the medium imprint object substrate 70 of both ends, and the roller member except tension roller 14i is fixed to the medium imprint object substrate 70. Where the belt approach prevention protruding line 141 is inserted in the level difference section 242 of the ends of the main part section 241 of a roller of the roller member except tension roller 14i, medium imprint belt 14a rotates.

[0081] It comes floating, while the belt approach prevention protruding line 141 rotates, and the guide plate 171 which is the guide member which counters the both ends of 14d of driving rollers with the belt approach prevention protruding line 141 on both sides of medium imprint belt 14a, and guides the edge of medium imprint belt 14a to them is formed so that it may not run aground on the main part section of roller 241 edge front face of 14d of driving rollers which are one of the roller members. What gave the good Teflon coat of slipping nature is used for the medium imprint belt 14a side front face by tabular members, such as rubber material and resin material, and a guide plate 171 is attached in the holder board 172 using the board member of the shape of L character attached in the medium imprint object substrate 70. For a guide plate 171, it is attached with medium imprint belt 14a and Gap d, and Gap d is below  $x(1/3)t$  (it is  $d \leq (1/3)xt$ ) to thickness t of the 0.8-1.5mm belt approach prevention protruding line 141. If it is desirable that it is  $d \leq 0.5\text{mm}$  and Gap d exceeds  $x(1/3)t$  Although the belt approach prevention protruding line 141 runs aground and there is no end, rub with the edge of the main part section 241 of a roller, and \*\*\*\* arises. It can delete, \*\*\*\* adheres to the rear face of medium imprint belt 14a, it is inserted between 14d of driving rollers, and the poor imprint at the time of the imprint generated by forming irregularity in medium imprint belt 14a and the life lowering of medium imprint belt 14a depended for the ability deleting arise. A guide plate 171 may be made into medium imprint belt 14a and a contact condition. By less than 0.8mm, if thickness t of the belt approach prevention protruding line 141 is too thin If the belt approach prevention protruding line 141 becomes easy to run in the main part section 241 of a roller aground and the belt approach prevention protruding line 141 is too thick exceeding 1.5mm The waist of medium imprint belt 14a becomes strong, the load of medium imprint belt 14a is applied at the time of 14d revolution of driving rollers, the revolution of 14d of driving rollers does not become uniform, or ends are stretched strongly, the center section of medium imprint belt 14a lenticulates, and a belt



side is not maintained at homogeneity.

[0082] Moreover, as shown in drawing 13, it is desirable to form a guide plate 171 along the flat surface of medium imprint belt 14a which touches the photo conductor drum 10 which is image support. That is, in the case of this operation gestalt, it is a 14d of driving rollers ], ground roller 14j, and follower roller 14e upside, and it is desirable to arrange a guide plate 171 to medium imprint belt 14a and parallel. Thereby, the wrinkling and relief of medium imprint belt 14a are prevented, and the imprint unevenness and image \*\*\*\*\* which are produced with the wrinkling and float of medium imprint belt 14a in the flat surface of medium imprint belt 14a which touches the photo conductor drum 10 are prevented.

[0083] As a guide member in the above, what gave the good Teflon coat of slipping nature may be used for the front face of the member of the shape of a roll of for example, rubber material or resin material instead of said guide plate 171.

[0084] While the approach of a belt-like medium imprint object is prevented by the belt approach stop member by the above, the poor imprint at the time of turbulence and an imprint of the toner image on the medium imprint object to the roller member of a belt approach stop member which runs aground, - drop is prevented, runs aground, and is generated according to the actuation unevenness of the medium imprint object at the time of - drop is prevented by it.

[0085] According to drawing 14 or drawing 15, medium imprint belt 14a which is a medium imprint object is laid [ firmly ] across 14d of driving rollers, ground roller 14j, follower roller 14e, guide-idler 14f, and tension roller 14i. The belt approach prevention protruding line 141 which is a belt approach stop member using a rubber member is formed in the both ends of medium imprint belt 14a. On the other hand, 14d of driving rollers as a roller member except tension roller 14i which lays medium imprint belt 14a, ground roller 14j, follower roller 14e, and guide-idler 14f It consists of the axis of rotation 243 of ends, and the level difference section 242 of the ends of the main part section 241 of a roller which rotates the axis of rotation 243 as a center, and the main part section 241 of a roller. A bearing B3 is inserted in the axis of rotation 243 of roller member both ends, the bearing case 71 of the both ends which contain a bearing B3 is attached in the medium imprint object substrate 70 of both ends, and the roller member except tension roller 14i is fixed to the medium imprint object substrate 70. Where the belt approach prevention protruding line 141 is inserted in the level difference section 242 of the ends of the main part section 241 of a roller of the roller member except tension roller 14i, medium imprint belt 14a rotates.

[0086] It comes floating, while the belt approach prevention protruding line 141 rotates, and the press roller 271 which is the press member which counters with the belt approach prevention protruding line 141 in contact with medium imprint belt 14a, and presses the edge of medium imprint belt 14a is formed in the both ends of 14d of driving rollers so that it may not run aground on the main part section of roller 241 edge front face of 14d of driving rollers which are one of the roller members. What gave the good Teflon coat of slipping nature is used for a front face by the member of the shape of a roll, such as rubber material and resin material, and the press roller 271 is inserted in the axis of rotation 273 prepared in the holder board 272 using the board member attached in the medium imprint object substrate 70, is stopped in E ring ER, and is attached in the axis of rotation 243 pivotable. The thrust is adjusted to 0.5-3.0gr, it is fixed, and the press roller 271 is followed and rotated to medium imprint belt 14a so that neither deformation of the edge of medium imprint belt 14a nor a poor revolution may be caused at the time of mounting of the holder board 272.

[0087] Moreover, as shown in drawing 15, it is desirable to form the press roller 271 along the flat surface of medium imprint belt 14a which touches the photo conductor drum 10 which is image support. That is, in the case of this operation gestalt, it is desirable to arrange the press roller 271 to the 14d [ of driving rollers ], ground roller 14j, and follower roller 14e up side. Thereby, the wrinkling and relief of medium imprint belt 14a are prevented, and the imprint unevenness and image \*\*\*\*\* which are produced with the wrinkling and float of medium imprint belt 14a in the flat surface of medium imprint belt 14a which touches the photo conductor drum 10 are prevented.

[0088] As a press member in the above, what gave the good Teflon coat of slipping nature may be used for the front face of the tabular member of for example, rubber material or resin material instead of said press roller 271.

[0089] While the approach of a belt-like medium imprint object is prevented by the belt approach stop member by the above, the poor imprint at the time of turbulence and an imprint of the toner image on the medium imprint object to the roller member of a belt approach stop member which runs aground, - drop is prevented, runs aground, and is generated according to the actuation unevenness of the medium imprint object at the time of - drop is prevented by it.

[0090] Drawing 16 explains other operation gestalten of the image formation equipment common to each claim of this invention explained with each above-mentioned operation gestalt. Drawing 16 is outline explanatory drawing of the color picture formation equipment in which other operation gestalten of the image formation equipment common to each claim of this invention are shown.

[0091] Photo conductor drum 10b which is the 1st image support which forms the toner image (rear-face toner image) used as a rear-face image as the image formation equipment of this example shows to drawing 16, Photo conductor drum 10a which is the 2nd image support which forms the toner image (surface toner image) used as a surface image is prepared independently, respectively. After imprinting on medium imprint belt 114a which is a medium imprint object by primary imprint machine 114b by which the rear-face toner image formed in photo conductor drum 10b is impressed to the voltage of a toner and antipole nature (it sets in this operation gestalt and is plus polarity), By electrification of the paper electrification machine 150 which supplies the recording paper P which is imprint material on medium imprint belt 114a between photo conductor drum 10b and photo conductor drum 10a, counters with ground roller 14k on both sides of medium imprint belt 114a, and is established The surface toner image which the recording paper P was made to stick to medium imprint belt 114a, conveyed, and was formed on photo conductor drum 10a After imprinting on the front face of the recording paper P by secondary imprint machine 114c to which the

voltage of a toner and antipole nature (it sets in this operation gestalt and is plus polarity) is impressed, The rear-face toner image on medium imprint belt 114a is imprinted at the rear face of the recording paper P with a toner and 114 vessels of 3rd imprint machines with which it is impressed by the voltage of antipole nature (it sets in this operation gestalt and is plus polarity). The recording paper P with which the toner image of the front reverse side was formed on the recording paper P, and the color toner image was formed in both sides The curvature of the curvature section KT of medium imprint belt 114a, With the electric discharge operation with 14h of paper separation AC electric discharge machines as an imprint material separation means formed in the edge of medium imprint belt 114a if needed, and the separation pawl 210 which vacates medium imprint belt 114a and a predetermined gap, and is formed in the conveyance section 160 Dissociate from medium imprint belt 114a, and it conveys to the anchorage device 17 as a fixation means through the spur 162 which is the spur member prepared in the conveyance section 160. The toner image on the recording paper P is established in the nip section T between 1st fixing roller 17a and 2nd fixing roller 17b, and a double-sided image is obtained.

[0092] The thing of the function as the photo conductor drum 10 explained with said image formation equipment or medium imprint belt 14a with same photo conductor drums 10a and 10b and medium imprint belt 114a in the image formation equipment of this example and structure is used. Medium imprint belt 114a is inscribed in and laid [ firmly ] across 14d of driving rollers and ground roller 14j which are a roller member, respectively, ground roller 14k, follower roller 14e, guide-idler 14f, and tension roller 14i. Moreover, the electric discharge machines 114m and 114n which are electric discharge means, respectively receive in the migration direction of medium imprint belt 114a. After primary imprint machine 114b and secondary imprint machine 114c, stand in a row with primary imprint machine 114b and secondary imprint machine 114c, and it is prepared. The alternating voltage which superimposed the direct current voltage of a toner, like-pole nature, or reversed polarity is impressed, and the charge of medium imprint belt 114a in which electrification is carried out by voltage impression of primary imprint machine 114b and secondary imprint machine 114c is discharged.

[0093] For a means to form the toner image used as a means to form the toner image used as a rear-face image in photo conductor drum 10b which is the 1st image support, and a surface image in photo conductor drum 10a which is the 2nd image support Yellow (Y), a Magenta (M) same in having been used with the image formation equipment mentioned above, Cyanogen (C) and 4 sets of development counters 13 (development means) for black (K) image formation processes, The scorotron electrification machine 11 (electrification means) and the exposure optical system 12 (image write-in means) are used for each to the photo conductor drums 10b and 10a, and form the toner image of a rear-face image, and the toner image of a surface image, respectively.

[0094] In this example, similarly the portion whose medium imprint object location at the time of a halt is a roller member contact location with drawing 4 or drawing 5 having explained moreover, by the print condition It is because it maintains in the 1st image support contact location or the 2nd image support contact location. Correction of the deflection peculiarity of medium imprint belt 114a in the roller member contact location of medium imprint belt 114a with roller members, such as 14d [ of driving rollers ], ground roller 14j, ground roller 14k, follower roller 14e, and guide-idler 14f, is performed. The deflection peculiarity in the roller member contact location of the medium imprint object of the shape of a belt at the time of a halt which is not canceled only by preliminary revolution is corrected by this. The imprint omission of the toner image in the time of the imprint of the rear-face toner image from the 1st image support generated by the deflection peculiarity of a medium imprint object to a medium imprint object, the imprint to the imprint material of the surface toner image on the 2nd image support, and the imprint to the imprint material of the rear-face toner image on a medium imprint object etc., The poor imprint at the time of turbulence and an imprint of the toner image on the medium imprint object by the revolution unevenness of the medium imprint object in each roller member location by the irregularity of the deflection peculiarity of a medium imprint object is prevented.

[0095] Similarly the portion whose medium imprint object location at the time of a halt is the 1st image support contact location or the 2nd image support contact location with drawing 6 or drawing 7 having explained moreover, by the print condition It is because it maintains in a roller member contact location with roller members, such as 14d [ of driving rollers ], ground roller 14j, ground roller 14k, follower roller 14e, and guide-idler 14f. Correction of the deflection peculiarity of medium imprint belt 114a in the 1st image support contact location of medium imprint belt 114a with photo conductor drum 10a which is photo conductor drum 10b or the 2nd image support which is the 1st image support, or the 2nd image support contact location is performed. The deflection peculiarity in the 1st image support contact location of the medium imprint object of the shape of a belt at the time of a halt which is not canceled only by preliminary revolution or the 2nd image support contact location is corrected by this. The imprint omission of the toner image in the time of the imprint of the rear-face toner image from the 1st image support generated by the deflection peculiarity of a medium imprint object to a medium imprint object, the imprint to the imprint material of the surface toner image on the 2nd image support, and the imprint to the imprint material of the rear-face toner image on a medium imprint object etc., The poor imprint at the time of turbulence and an imprint of the toner image on the medium imprint object by the revolution unevenness of the medium imprint object in each roller member location by the irregularity of the deflection peculiarity of a medium imprint object is prevented.

[0096] The portion whose medium imprint object location at the time of a halt is a roller member contact location furthermore, by the print condition The portion maintaining in the 1st image support contact location or the 2nd image support contact location and whose medium imprint object location at the time of a halt are the 1st image support contact location or the 2nd image support contact location by the print condition By repeating, maintaining in a roller member contact location 14d of driving rollers, Ground roller 14j, Follower roller 14e And the music of the both sides of medium imprint belt 114a produced in the deflection peculiarity of medium imprint belt 114a and photo conductor drum 10b which are produced in the roller member



contact location of roller members, such as guide-idler 14f, the 1st image support contact location with photo conductor drum 10a, or the 2nd image support contact location Correction of \*\*\*\* is performed. The deflection peculiarity in the roller member contact location of the medium imprint object of the shape of a belt at the time of a halt which is not canceled only by preliminary revolution and the deflection peculiarity in the 1st image support contact location or the 2nd image support contact location are corrected by this. The imprint omission of the toner image in the time of the imprint of the rear-face toner image from the 1st image support generated by the deflection peculiarity of a medium imprint object to a medium imprint object, the imprint to the imprint material of the surface toner image on the 2nd image support, and the imprint to the imprint material of the rear-face toner image on a medium imprint object etc., The poor imprint at the time of turbulence and an imprint of the toner image on the medium imprint object by the revolution unevenness of the medium imprint object in each roller member location by the irregularity of the deflection peculiarity of a medium imprint object is prevented.

[0097] Moreover, correction of the deflection peculiarity of medium imprint belt 114a in a roller member contact location with roller members, such as 14d [ of driving rollers of medium imprint belt 114a in the case where the time amount to a print is long ], ground roller 14j, ground roller 14k, follower roller 14e, and guide-idler 14f, is similarly performed by the waiting state with drawing 8 having explained with the power supply on by changing a roller member contact location intermittently. The deflection peculiarity in the roller member contact location of the medium imprint object of the shape of a belt produced also with a power supply on by this when the waiting state time amount to a print is long is corrected. The imprint omission of the toner image in the time of the imprint of the rear-face toner image from the 1st image support generated by the deflection peculiarity of a medium imprint object to a medium imprint object, the imprint to the imprint material of the surface toner image on the 2nd image support, and the imprint to the imprint material of the rear-face toner image on a medium imprint object etc., The poor imprint at the time of turbulence and an imprint of the toner image on the medium imprint object by the revolution unevenness of the medium imprint object in each roller member location by the irregularity of the deflection peculiarity of a medium imprint object is prevented.

[0098] It is made the same with drawing 9 having explained. Moreover, in the waiting state the 1st image support contact location or the 2nd image support contact location is changed intermittently -- it depends rattlingly -- Correction of the deflection peculiarity of medium imprint belt 114a in the 1st image support contact location with photo conductor drum 10b of medium imprint belt 114a in the case where the time amount to a print is long, or photo conductor drum 10a, or the 2nd image support contact location is performed also with a power supply on. The deflection peculiarity in the 1st image support contact location of a belt-like medium imprint object or the 2nd image support contact location produced also with a power supply on by this when the waiting state time amount to a print is long is corrected. The imprint omission of the toner image in the time of the imprint of the rear-face toner image from the 1st image support generated by the deflection peculiarity of a medium imprint object to a medium imprint object, the imprint to the imprint material of the surface toner image on the 2nd image support, and the imprint to the imprint material of the rear-face toner image on a medium imprint object etc., The poor imprint at the time of turbulence and an imprint of the toner image on the medium imprint object by the revolution unevenness of the medium imprint object in each roller member location by the irregularity of the deflection peculiarity of a medium imprint object is prevented.

[0099] Moreover, as drawing 10 explained, while preparing a belt approach stop member in the both ends of a medium imprint object When establishing a curved surface in the roller angle-of-rotation-of-member section which receives a belt approach stop member and setting the radius of the curved surface of  $t$  (mm) and the roller angle-of-rotation-of-member section to  $r$  (mm) for the thickness of a belt approach stop member, being referred to as  $t/5 \leq r \leq t/3$  -- preferably thickness  $t$  of a belt approach stop member the roller angle-of-rotation-of-member section of roller members, such as referring-to [ as 0.8-1.5mm ] \*\*\*\*, 14d [ of driving rollers ], ground roller 14j, follower roller 14e, and guide-idler 14f, -- grind -- the belt approach stop member boiled and depended can be deleted, and prevention is performed. By this, while the approach of a belt-like medium imprint object is prevented by the belt approach stop member the roller angle-of-rotation-of-member section of a belt approach stop member -- grind -- \*\*\*\* boiled and depended should be prevented, delete, and \*\*\*\* should adhere to a belt-like medium imprint object rear face, and be caught between roller members -- lowering of the life of the poor imprint generated by forming irregularity in a medium imprint object and the medium imprint object twisted for the ability deleting is prevented.

[0100] Moreover, as drawing 11 explained, while preparing a belt approach stop member in the both ends of a medium imprint object When preparing the rotation member which receives a belt approach stop member in the both-sides edge of a roller member and setting the overall diameter of the firm-bridging section of the medium imprint object of  $R1$  (mm) and a roller member to  $R2$  (mm) for the overall diameter of the contact surface with the side of a rotation member and a roller member,  $(R1/R2)$  By being referred to as  $<1/2$ , the belt approach stop member which prepares a rotation member can be deleted, and prevention is performed. By this, while the approach of a belt-like medium imprint object is prevented by the belt approach stop member \*\*\*\* of a belt approach stop member is prevented by few rotation members of resistance in the contact surface with a roller member. It can delete, \*\*\*\* adheres to a belt-like medium imprint object rear face, it is inserted between roller members, and lowering of the life of the poor imprint at the time of the imprint generated by forming irregularity in a medium imprint object and the medium imprint object twisted for the ability deleting is prevented.

[0101] Moreover, as drawing 12 or drawing 13 explained, while preparing a belt approach stop member in the both ends of a medium imprint object the guide member of a roller member which counters any one both ends with a belt approach stop member on both sides of a medium imprint object, and guides the edge of a medium imprint object to them at least is prepared -- it depends rattlingly -- The belt approach stop member using a guide member (14d of driving rollers as a roller member except tension roller 14i, ground roller 14j, ground roller 14k, follower roller 14e, and guide-idler 14f) runs aground, and prevention is

performed. Thereby, while the approach of a belt-like medium imprint object is prevented by the belt approach stop member using a guide member, the poor imprint at the time of turbulence and an imprint of the toner image on the medium imprint object to the roller member of a belt approach stop member which runs aground, - drop is prevented, runs aground, and is generated according to the actuation unevenness of the medium imprint object at the time of - drop is prevented.

[0102] Furthermore, the imprint unevenness and image \*\*\*\*\* which preparing a guide member along the flat surface of the medium imprint object which contacts image support produces with the wrinkling and float of a medium imprint object in the flat surface of the medium imprint object which belt-like the wrinkling and relief of a medium imprint object are prevented, and touches image support are prevented, and it is desirable.

[0103] Moreover, as drawing 14 or drawing 15 explained, while preparing a belt approach stop member in the both ends of a medium imprint object Preparing-press member of roller member which counters any one both ends with belt approach stop member at least, and presses edge front face of medium imprint object \*\*\*\*, The belt approach stop member using a press member (14d of driving rollers as a roller member except tension roller 14i, ground roller 14j, ground roller 14k, follower roller 14e, and guide-idler 14f) runs aground, and prevention is performed. Thereby, while the approach of a belt-like medium imprint object is prevented by the belt approach stop member using a press member, the poor imprint at the time of turbulence and an imprint of the toner image on the medium imprint object to the roller member of a belt approach stop member which runs aground, - drop is prevented, runs aground, and is generated according to the actuation unevenness of the medium imprint object at the time of - drop is prevented.

[0104] Furthermore, the imprint unevenness and image \*\*\*\*\* which preparing a press member along the flat surface of the medium imprint object which contacts image support produces with the wrinkling and float of a medium imprint object in the flat surface of the medium imprint object which belt-like the wrinkling and relief of a medium imprint object are prevented, and touches image support are prevented, and it is desirable.

[0105] In addition, although the direct toner image was formed on image support in each example of above-mentioned drawing 1 or the image formation equipment of drawing 16, an image formation object may be established apart from image support, and the toner image formed on this image formation object may be made to support on image support. Moreover, although color picture formation equipment explained as each example of the above-mentioned image formation equipment, this invention is not necessarily limited to this and is applied also to the image formation equipment of the monochrome by the same process with drawing 1 or drawing 16 having explained.

[0106] Furthermore, of course, also do one side image formation which forms an image in one side of only the front face of imprint material, or a rear face other than the double-sided image formation which forms an image in both sides of imprint material which was explained with each above-mentioned image formation equipment with the image formation equipment of this invention.

[0107]

[Effect of the Invention] According to claim 1 thru/or 3, the deflection peculiarity of the medium imprint object of the shape of a belt at the time of a halt which is not canceled only by preliminary revolution is corrected, and the poor imprint at the time of turbulence and an imprint of the toner image on the medium imprint object by the revolution unevenness of the imprint omission of the toner image generated by the deflection peculiarity of a medium imprint object or a medium imprint object is prevented.

[0108] According to claims 4 or 5, the deflection peculiarity of the medium imprint object of the shape of a belt produced also with a power supply on when the waiting state time amount to a print is long is corrected, and the poor imprint at the time of turbulence and an imprint of the toner image on the medium imprint object by the revolution unevenness of the imprint omission of the toner image generated by the deflection peculiarity of a medium imprint object or a medium imprint object is prevented.

[0109] While the approach of a belt-like medium imprint object is prevented by the belt approach stop member according to claims 6 or 7 the roller angle-of-rotation-of-member section of a belt approach stop member -- grind -- \*\*\*\* boiled and depended should be prevented, delete, and \*\*\*\* should adhere to a belt-like medium imprint object rear face, and be caught between roller members -- lowering of the life of the poor imprint generated by forming irregularity in a medium imprint object and the medium imprint object twisted for the ability deleting is prevented.

[0110] While the approach of a belt-like medium imprint object is prevented by the belt approach stop member according to claim 8 \*\*\*\* of a belt approach stop member is prevented by few rotation members of resistance in the contact surface with a roller member. It can delete, \*\*\*\* adheres to a belt-like medium imprint object rear face, it is inserted between roller members, and lowering of the life of the poor imprint at the time of the imprint generated by forming irregularity in a medium imprint object and the medium imprint object twisted for the ability deleting is prevented.

[0111] According to claim 9 thru/or 12, while the approach of a belt-like medium imprint object is prevented by the belt approach stop member, the poor imprint at the time of turbulence and an imprint of the toner image on the medium imprint object to the roller member of a belt approach stop member which runs aground, - drop is prevented, runs aground, and is generated according to the actuation unevenness of the medium imprint object at the time of - drop is prevented.

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[Translation done.]

**\* NOTICES \***

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1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

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**CLAIMS**

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[Claim(s)]

[Claim 1] The image-formation equipment characterized in image-formation equipment which imprints a toner image formed of image support to both sides of imprint material through a medium imprint object of the shape of a belt laid by two or more roller members by to maintain a portion whose medium imprint object location at the time of a halt is a roller member contact location in an image support contact location by print condition.

[Claim 2] The image-formation equipment characterized in image-formation equipment which imprints a toner image formed of image support to both sides of imprint material through a medium imprint object of the shape of a belt laid by two or more roller members by to maintain a portion whose medium imprint object location at the time of a halt is an image support contact location in a roller member contact location by print condition.

[Claim 3] The image-formation equipment according to claim 1 or 2 characterized by to repeat maintaining the portion whose medium imprint object location at the time of said halt is a roller member contact location in said image support contact location by print condition, and maintaining the portion whose medium imprint object location at the time of said halt is an image support contact location in said roller member contact location by the print condition.

[Claim 4] Image formation equipment characterized by changing a roller member contact location intermittently in the waiting state in image formation equipment which imprints a toner image formed of image support to both sides of imprint material through a medium imprint object of the shape of a belt laid by two or more roller members.

[Claim 5] Image formation equipment characterized by changing an image support contact location intermittently in the waiting state in image formation equipment which imprints a toner image formed of image support to both sides of imprint material through a medium imprint object of the shape of a belt laid by two or more roller members.

[Claim 6] In image formation equipment which imprints a toner image formed of image support to both sides of imprint material through a medium imprint object of the shape of a belt laid by two or more roller members, while preparing a belt approach stop member in both ends of said medium imprint object Image formation equipment which establishes a curved surface in the roller angle-of-rotation-of-member section which receives said belt approach stop member, and is characterized by setting thickness of said belt approach stop member to  $t/5 \leq r \leq t/3$  when setting a radius of a curved surface of  $t$  (mm) and said roller angle-of-rotation-of-member section to  $r$  (mm).

[Claim 7] Image formation equipment according to claim 6 characterized by setting thickness  $t$  of said belt approach stop member to 0.8-1.5mm.

[Claim 8] In image formation equipment which imprints a toner image formed of image support to both sides of imprint material through a medium imprint object of the shape of a belt laid by two or more roller members, while preparing a belt approach stop member in both ends of said medium imprint object A rotation member which receives said belt approach stop member is prepared in a both-sides edge of said roller member. Image formation equipment characterized by setting an overall diameter of the contact surface with the side of said rotation member and said roller member to  $<(R1/R2) 1/2$  when setting an overall diameter of the firm-bridging section of said medium imprint object of  $R1$  (mm) and said roller member to  $R2$  (mm).

[Claim 9] In image formation equipment which imprints a toner image formed of image support to both sides of imprint material through a medium imprint object of the shape of a belt laid by two or more roller members, while preparing a belt approach stop member in both ends of said medium imprint object Image formation equipment characterized by preparing a guide member of said roller member which counters any one both ends with said belt approach stop member on both sides of said medium imprint object, and guides an edge of said medium imprint object to them at least.

[Claim 10] Image formation equipment according to claim 9 characterized by preparing said guide member in said image support along a flat surface of said medium imprint object which touches a toner image formation means to form a toner image.

[Claim 11] In image formation equipment which imprints a toner image formed of image support to both sides of imprint material through a medium imprint object of the shape of a belt laid by two or more roller members, while preparing a belt approach stop member in both ends of said medium imprint object Image formation equipment characterized by preparing a press member of said roller member which counters any one both ends with said belt approach stop member at least, and presses an edge front face of said medium imprint object.

[Claim 12] Image formation equipment according to claim 11 characterized by preparing said press member in said image support along a flat surface of said medium imprint object which touches a toner image formation means to form a toner image.

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TITLE: IMAGE FORMING DEVICE

PUBN-DATE: August 15, 2000

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 , F16G001/14 , F16H007/18 , G03G015/00

ABSTRACT:

**PROBLEM TO BE SOLVED:** To prevent disturbance of a toner image on an intermediate transfer body and the occurrence of transfer failure during transfer, by keeping a portion of an intermediate transfer body, which is situated in a roller-member contact position when the intermediate transfer body is stopped, in an image-carrier contact position by the time until printing is ready.

**SOLUTION:** When stopped, an intermediate transfer belt 14a as an intermediate transfer body is stretched between a drive roller 14d, a ground roller 14j, a follower roller 14e, a guide roller 14f, and a tension roller 14i, all of which are roller members, and is kept in contact with a photoreceptor drum 10 being an image carrier. Therefore, habitual curvature in the intermediate transfer belt 14a occurs in a roller-member contact position P2 where it contacts the drive roller 14d being the roller member. In order to eliminate the habitual curvature, a portion of the intermediate transfer body situated in the roller-member contact position P2 where it contacts the drive roller 14d when stopped is turned and moved to an image-carrier contact position P1 where it contacts the photoreceptor drum 10. By the time printing is ready, that is, printing becomes possible, the portion is kept in the image-carrier contact position P1 where it contacts the photoreceptor drum 10.

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